

Machine and Tool BLUE BOOK

ESTABLISHED 1906

AUGUST 1954

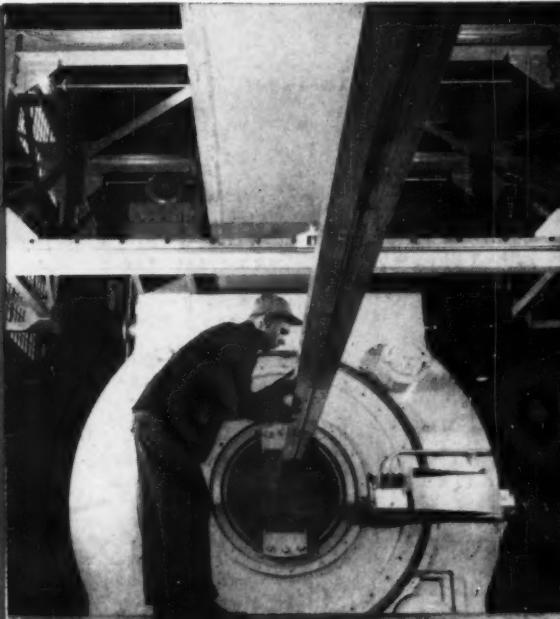
Beginning this issue!

An Important Series
on TIME STUDY

14,000-ton
Extrusion Press
in Operation

Some Interesting Uses
For Scrap

Vibration Isolation

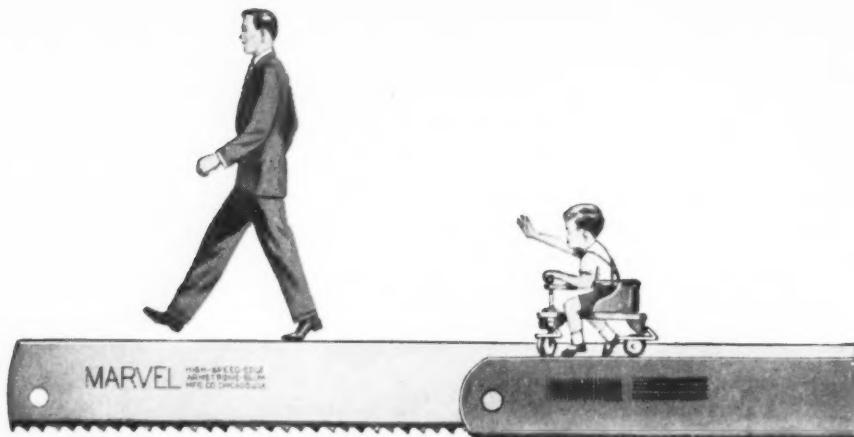


Letters to the Editor

*Special Report
on Presses*

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...but

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—without the "know-how" of MARVEL EXPERIENCE . . .

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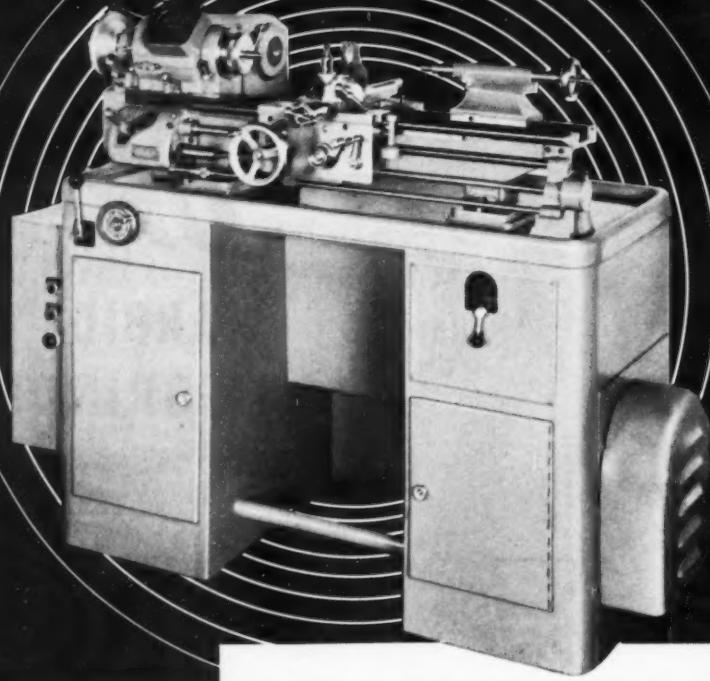
Hammond Machinery Builders
INC.

1614 DOUGLAS AVENUE

KALAMAZOO, MICHIGAN

Extremely useful . . .

**this Wade No. 8A LATHE
with variable speed feed!**



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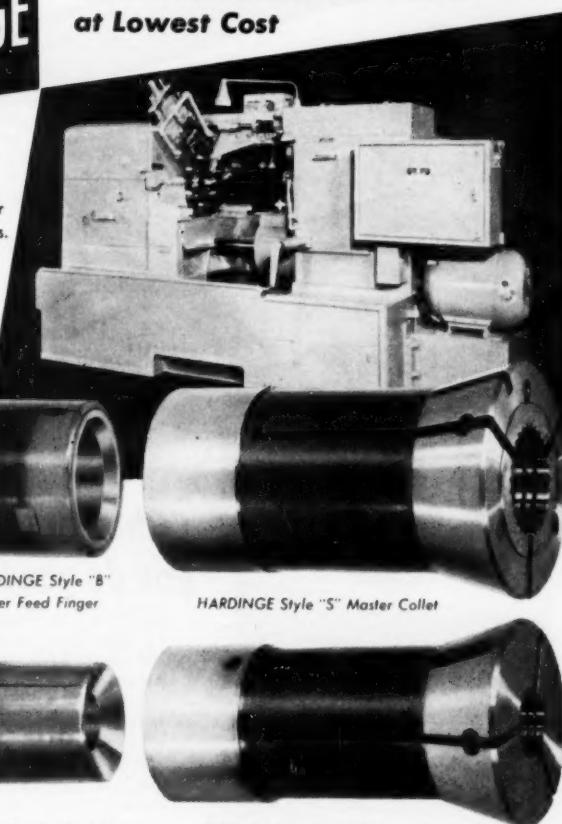
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Reduce tooling costs and step up production on your New Britain Automatics with HARDINGE customer shop-proved collets and feed fingers.

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WRITE FOR CATALOG

ARMSTRONG BROS. TOOL CO.

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THE BOOK

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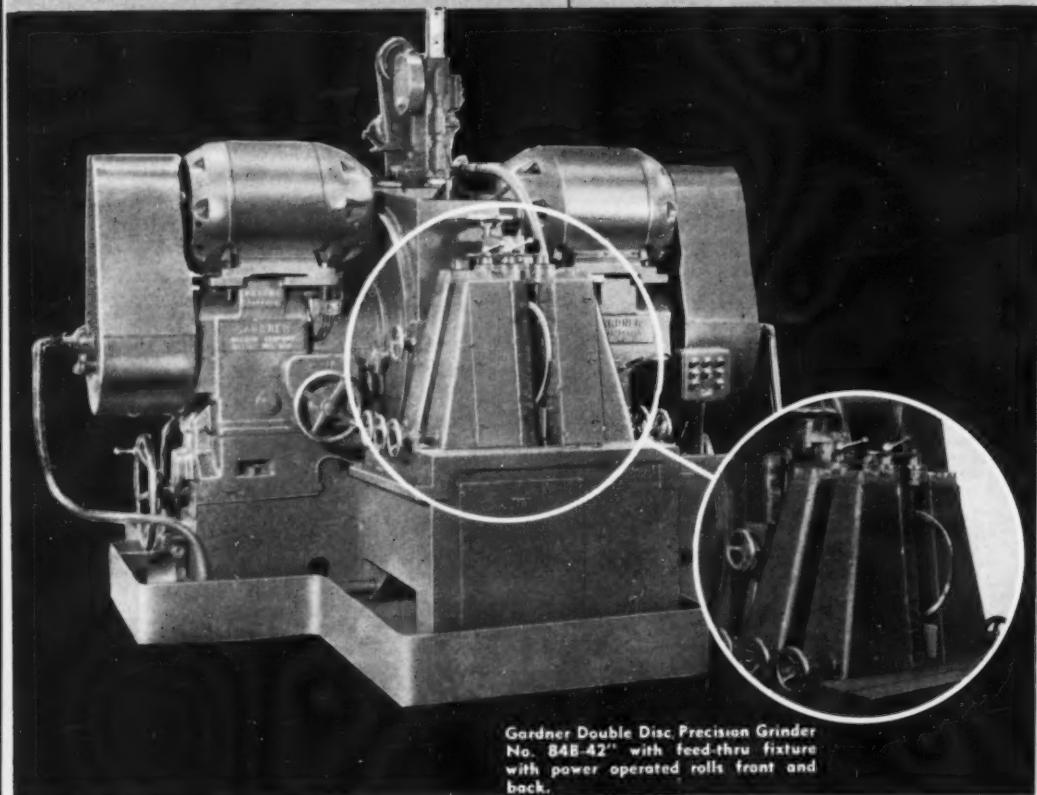


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back.

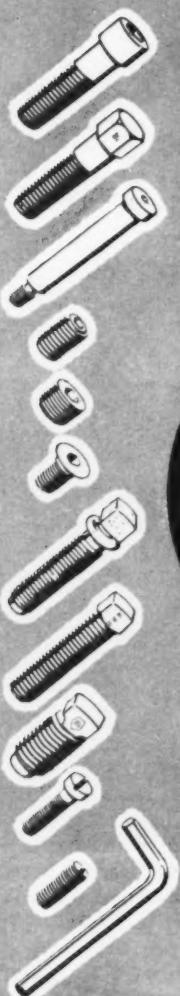
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Cincinnati



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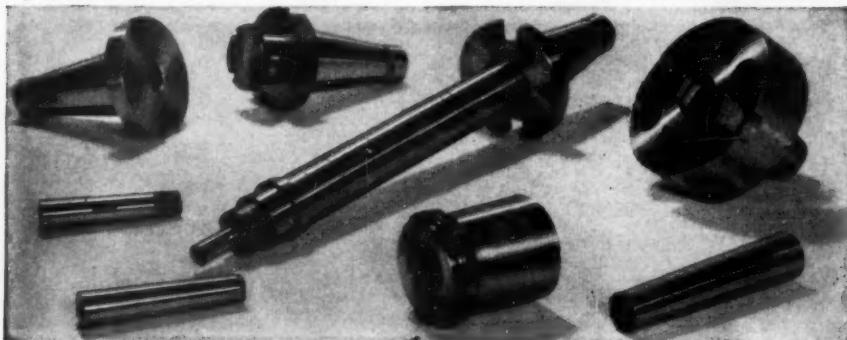


CINCINNATI

MACHINE and TOOL BLUE BOOK

Arbors

Help you get the most out of your
MILLING MACHINES



You can't push milling machines to their limit of production, accuracy and finish without the highest quality of arbors and accessories. That's the very reason for the quality manufacturing methods followed by Cincinnati. For example: arbor collars are hardened, and the ends are ground and lapped to assure squareness. Arbors are made of alloy steel forgings, heat treated to make them hard and resistant to deflection. Cincinnati offers a wide choice of arbors that satisfy the requirements of most shops . . . 21 sizes of "50 series" arbors from $\frac{7}{8}$ " to $2\frac{1}{2}$ " diameter; "quick change" equipment; spring chucks and collets. Many other accessories are tabulated in the catalog pictured here. Everyone concerned with the optimum production from milling machines should have a copy of CINCINNATI Arbors and Accessories, publication No. M-1664-4. May we send a copy to you?

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

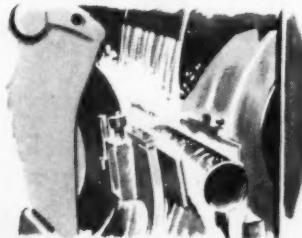
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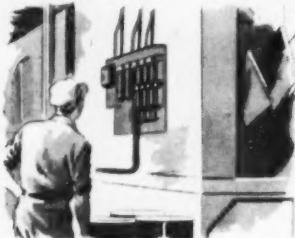
New S.E.C.O. is Tops For These Operations



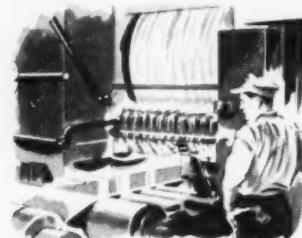
CUTTING WITH NEW S.E.C.O. Tools stay cool—require less frequent grinding. Finishes are uniformly good.



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make hobbing...and

**Special "Roll-Lock" Hobbing Fixture
improves pitch-line concentricity
and boosts production of drive
pinions at Allis Chalmers Mfg. Co.**



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other machining jobs more profitable

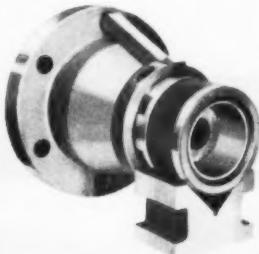
**Provides accurate,
centering, shrink fit on
ground hub of pinion.**

It's a new way of holding and driving the work for hobbing... as accurate as holding between centers... faster and more accurate than conventional chucking.

This Scully-Jones special "Roll-Lock" Chucking Fixture easily increased production of tractor drive pinions 10% by reducing handling time and increasing rigidity to permit heavier feeds.

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Drill Stops—Use them on turret lathes, radial drills and other machines to control depth of hole. Save time on sequence operations using quick-change setup. Bulletin No. 18-50.



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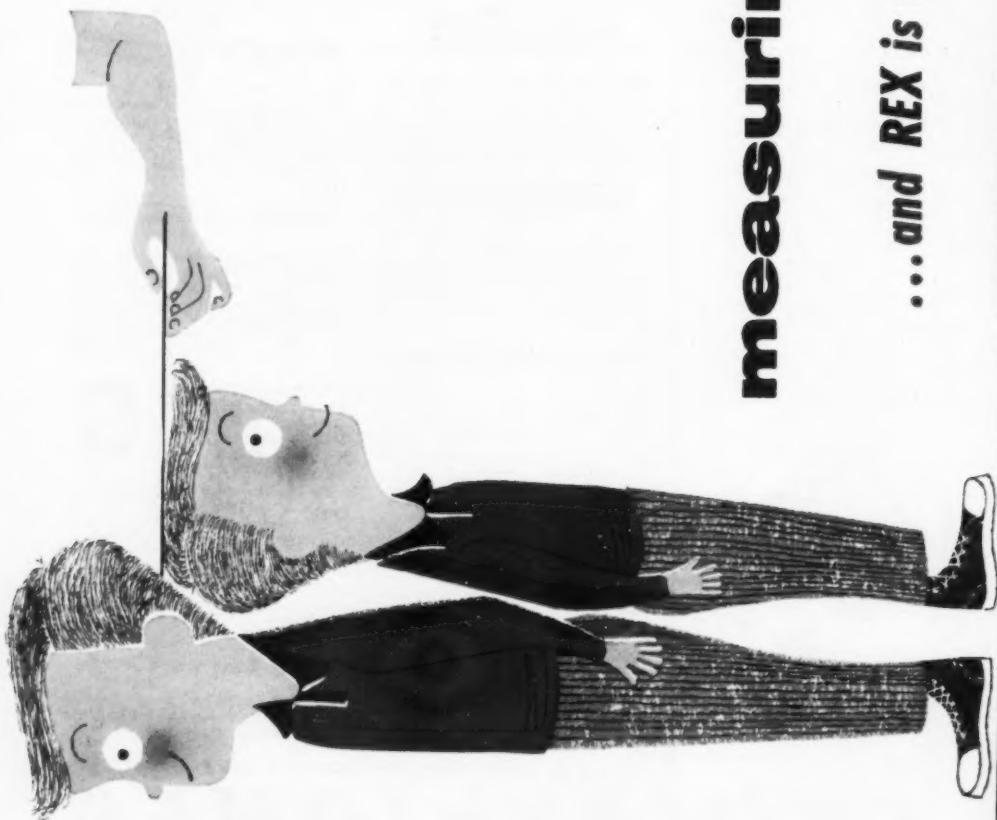
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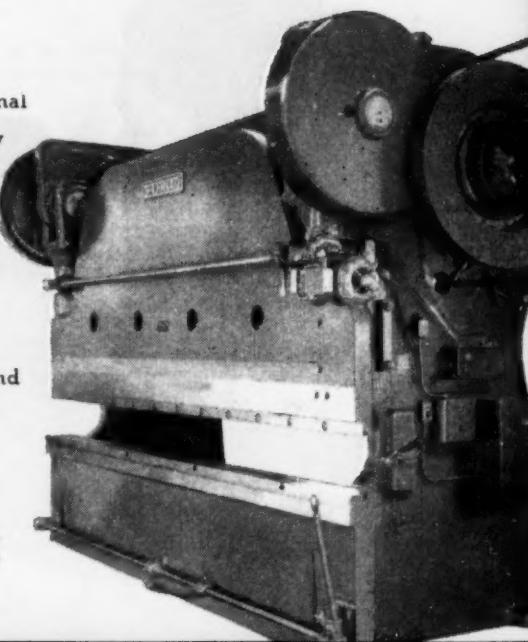


...could solve this problem

The long steel shelves of these sectional display racks are formed so accurately that sections match perfectly with lines straight and clean.

The Cincinnati Press Brake is forming to such close tolerances that a masking strip previously used is eliminated. A production increase and no discards has materially reduced costs while product was improved.

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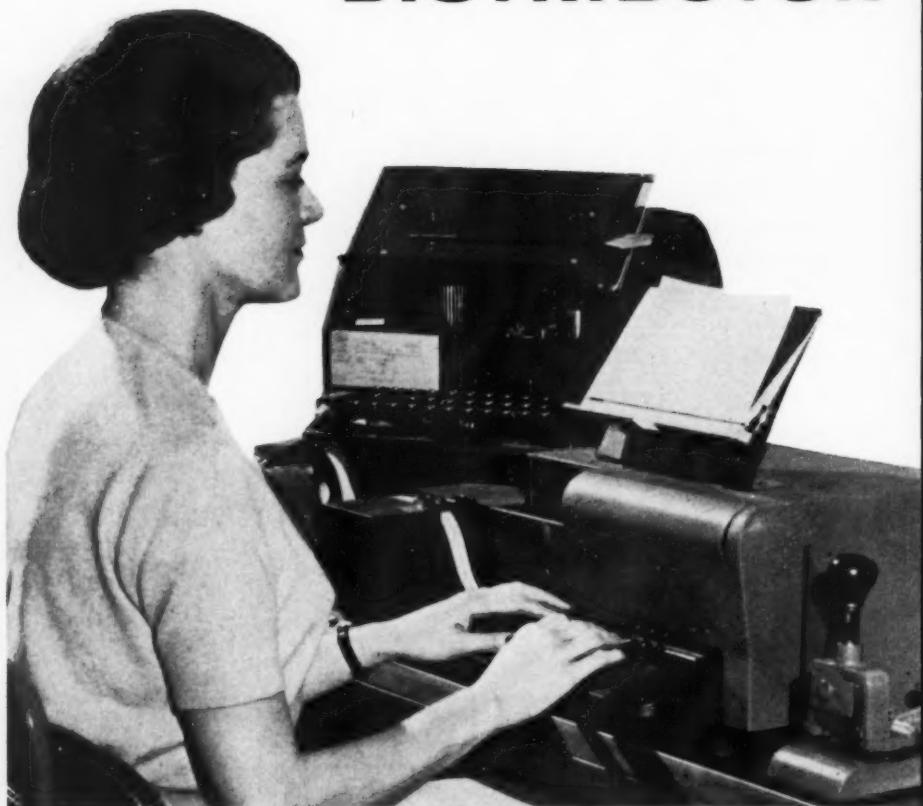
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SHAPERS • SHEARS • BRAKES

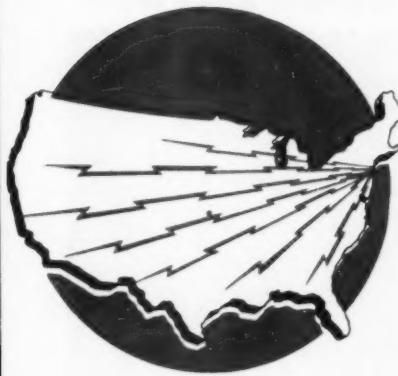


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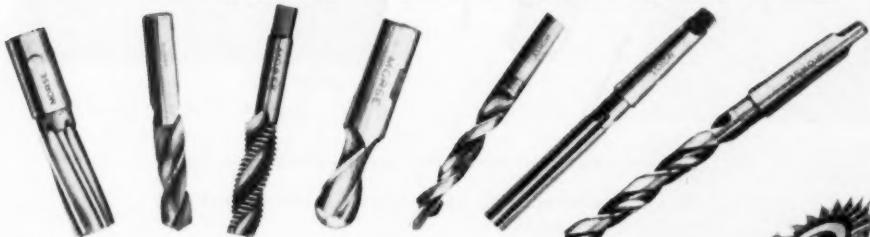
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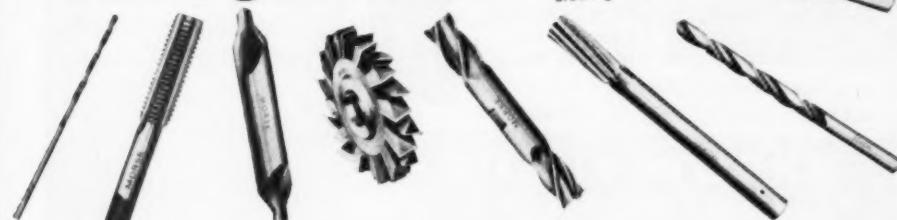
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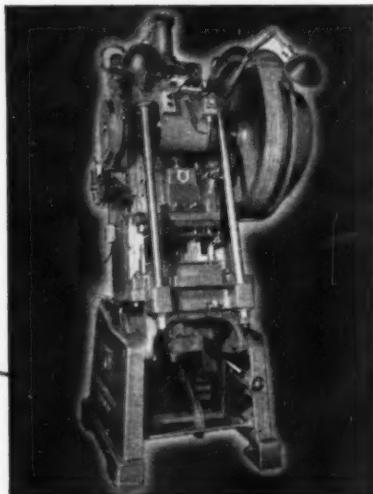
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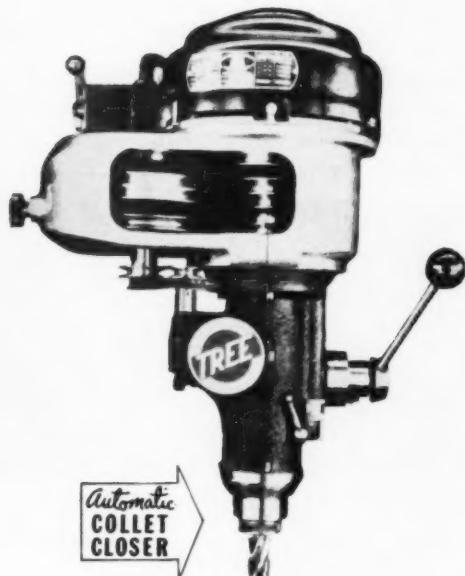
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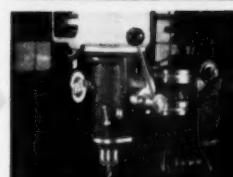
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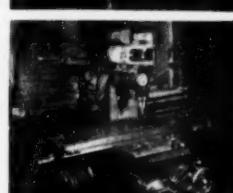
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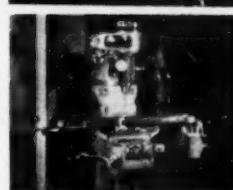
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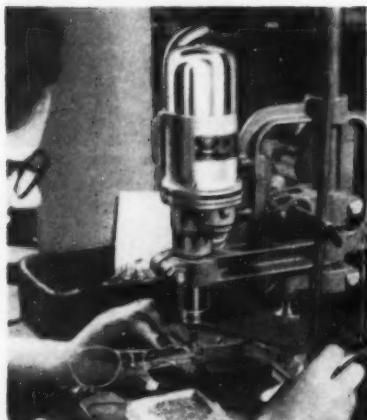
Bridgeport



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1600 JUNCTION AVENUE RACINE, WISCONSIN

"400% Faster!" "Output Up 110%!" "Costs Cut 64%!"



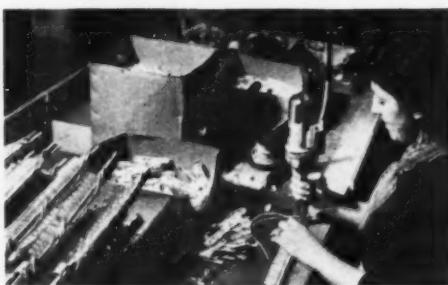
EYE GLASS FRAMES. Driving tiny optical screws — traditionally an "impossible" job for a power driver. Yet Millers Falls is doing it — and cutting labor costs 64%.



MINIATURE MOTORS. Problem: To drive tiny, self-tapping screws without stripping or splitting a thin plastic housing. Solution: Millers Falls No. 52's. Result: Production up 110%.

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that's right for practically
every driving problem**

Typical examples of how thousands of companies save time and money with Millers Falls "Adjustomatic"® Clutch Electric Screw Drivers



TRAVERSE TRACKS. Drive screws too tight — and tracks crush. Not tight enough — and stops loosen. Millers Falls' record on this job: Rejects — negligible. Speed — up 400%.

HEATING CONTROLS. Speed, accuracy, economy — on all three counts, this manufacturer chose Millers Falls after extensive tests with other electric and pneumatic drivers.



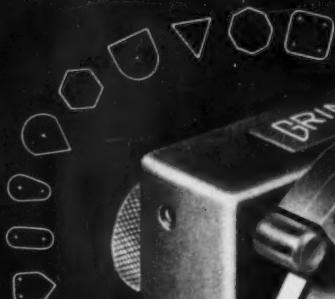
Write for full information or let us arrange for a demonstration.

MILLERS FALLS CO.
Dept. MT-3
Greenfield, Mass.



The Mark of Superiority

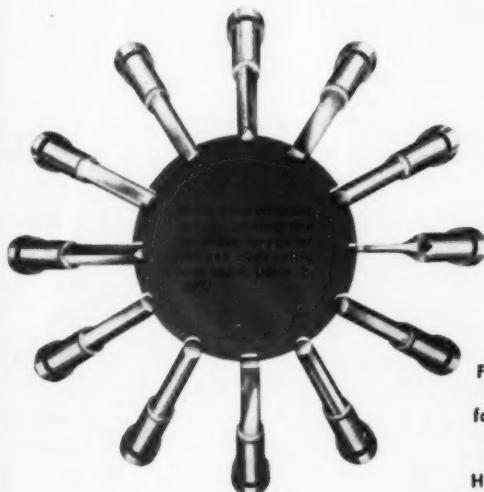
**For greater
ACCURACY, RANGE, SPEED
in grinding perforators!**



A few examples
of perforator
shapes that can
be made faster
and easier with
Grind-All.



Patent No.
2449459



For details on
service and
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for the fully
illustrated
Harig Catalog.

Harig *Grind-All* Fixture

Easier movement now
possible with new pre-
loaded ball bearing
type of construction.

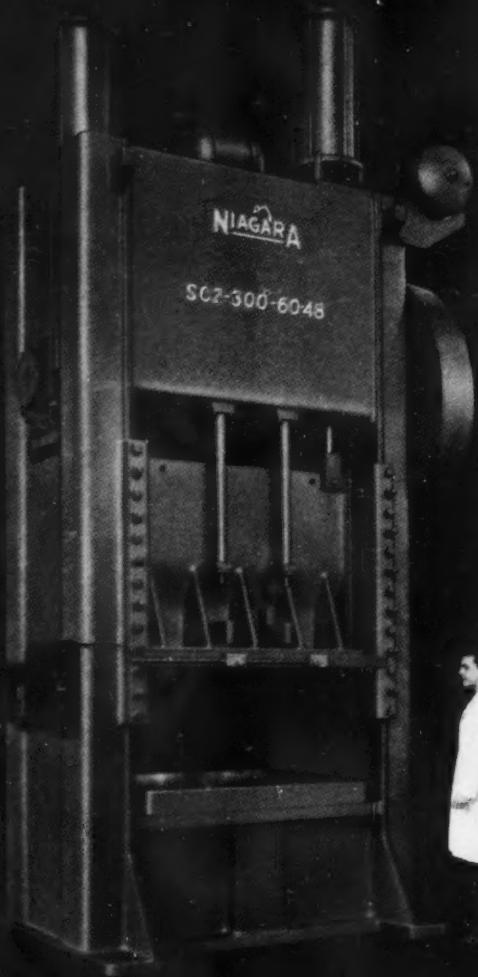
With the Harig Grind-
All fixture, you make perforator grind-
ing setups THREE TIMES FASTER —
grind a variety of regular and irreg-
ular contours with the greatest possible
accuracy and widest operating range.
Exclusive radius generating feature
makes fixture particularly adaptable
to carbide grinding.

Harig

Manufacturing Co.

311 Howard St., Chicago 5, Ill.

LOOK TO THIS NEW, PRODUCTION-BOOSTING LINE



50 THROUGH 300-TON CAPACITIES



America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

For a realistic answer to the metal stamping and forming problems of today... and tomorrow

DESIGN MODERNIZATION CONCEALS DRIVING MECHANISM

Fully streamlined, enclosed construction, front and back, provides pronounced advantages. There are no exposed, overhanging flywheel, clutch, brake, intermediate shaft, nor motor in rear of press to obstruct crane service, block light, throw grease and consume floor space unnecessarily... yet all parts are quickly accessible.

WORK-SAVING FLEXIBILITY MEETS SHIFTING PRODUCTION NEEDS

Box type welded steel slides are power adjusted through self-locking, worm driven, barrel type connections to accommodate a wide range of die heights and to permit quicker, easier and safer die setting. Niagara electric clutch control provides trouble-free push button operation and a five-position selector switch for ease, safety and efficiency in single stroking, continuous running, jogging, reverse jogging and slide adjustment.

RUGGED, HEAVY DUTY FRAMES PROLONG DIE LIFE

All-steel, rigidly constructed frames, featuring an exclusive triple box section design, provide maximum resistance to deflection from horizontal, diagonal and torsional stresses. Greater accuracy and longer die life are thereby assured.

GREAT SHUT HEIGHT AND LONG SLIDE ADJUSTMENT

Unusually liberal shut height and extremely long slide adjustment, of both one and four-piece frame construction, permit use of a tremendous range of stamping and forming dies.

Hailed as the most progressive step in straight side, double crank press history, the new Niagara SC-2 Press Series could only have originated from a keen insight of today's metal working problems and the more challenging ones of tomorrow. In every detail of design, you'll recognize the unduplicated competence of Niagara engineers. Who else would be more mindful of press users' needs than the men who design and build America's leading and most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work?



CHECK THE FEATURE-BY-FEATURE EVIDENCE

Preview this complete new line of straight side presses at once. Find out what they can do for you. Write for Niagara's new, illustrated Bulletin 64-H today.

NIAGARA MACHINE & TOOL WORKS BUFFALO 11, N. Y.

DISTRICT OFFICES:
Detroit • Cleveland • New York • Philadelphia
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NIAGARA

STRAIGHT SIDE DOUBLE CRANK PRESSES

over 30 YEARS of know-how is built into

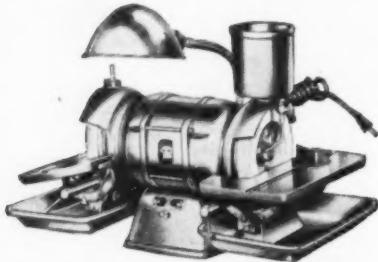
Baldor

GRINDERS

6" to 12" WHEELS—bench and pedestal types



BALDOR 600 Series Grinder 1/3 h.p., 1 phase, 60 cy., 3450 rpm., 6" wheels. \$49.00.



SPECIAL CARBIDE TOOL GRINDER built especially for sharpening carbide tools quickly and accurately. Reversible 1/2 h.p., motor withstands repeated overloads. \$149.20

BALL-BEARING
TOTALLY
ENCLOSED
HEAVY-DUTY

GRINDERS

BALDOR is a basic manufacturer of grinders—even the motors (the heart of the unit) are built by Baldor. These grinders are built for heavy-duty, precision grinding in shops and factories. They are totally enclosed, protected against dust, dirt and grit. Rotors are dynamically balanced—and each grinding wheel is balanced. Ball-bearings are "sealed-for-life" type.

ASK FOR
BULLETIN
321-J

on complete
line of Grinders
& Grinder-
Buffers.



Pedestals
available.

BALDOR ELECTRIC COMPANY

4368 Duncan Ave.

ST. LOUIS 10, MO.



Photo courtesy Caterpillar Tractor Co.

LEHMANN Boring Bars used for rough and finish boring in these blocks for cylinder liners

Here's another manufacturer — Caterpillar Tractor Co., Peoria, Illinois — who use Lehmann Boring Tools for precision boring. The bars above, made by Lehmann, bore a block for cylinder liners used in Caterpillar's D 386 and D 397 Diesel Engines. The Lehmann bars rough and finish bore for a close tolerance fit of the liners.

This is another example of how Lehmann's engineering and designing skill, put to work for special boring needs, can give accuracy and efficiency to the boring operations on your production line.

Depend on LEHMANN Boring Tool for . . .

- Top engineering experience — 35 years approved by industry.
- Skilled machinist experience to give efficient, accurate, precision tools every time.
- Help cut machinery time to a minimum and put utility and economy in your boring operations.
- To stop costly errors in tool setting — tools are especially designed and engineered to your needs.

**LEHMANN BORING
TOOL**

4389 DUNCAN AVE.

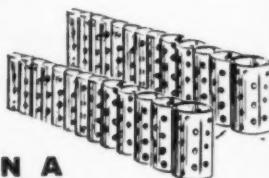
ST. LOUIS 16, MO.

Tell us your problems
without obligation—or—write
today for CATALOG BT-12.

DIVISION OF
NOVO ENGINE CO.



**IT'S SO EASY
TO TURN A
"LONG GRIND"
INTO A
QUICK,
PROFITABLE
RUN—**



**— ON A
"BUFFALO"
NO. 16 DRILL
LIKE THIS**

"Fussy" jobs running into thousands of holes, such as the above, drilling graphite lubrication holes in bronze bushings, can be real headaches—but not with this "Buffalo" No. 16 Drill! See how controls, spindle and working table are designed from the operator's point of view. His position is always natural, relaxed. Visibility of work is always good. Accuracy and high output come easily on a "Buffalo" Drill! And this high-quality, medium-price, medium capacity drill is yours in a choice of 3 over-hangs, 8", 12" and 15"; sensitive (hand feed) or power feed in one to eight spindles, bench or pedestal models; in up to six spindles. Why not write for Bulletin 2730G and see the many jobs the "16" could be speeding up in your plant?

BUFFALO FORGE CO.

161 Mortimer St.

Buffalo, N.Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING • PUNCHING • SHEARING • BENDING



520 CUTS

IN AN 8-HOUR DAY...

Angles, Bars, Channels and Beams

Report from

Joseph T. Ryerson & Son, Inc., Chicago; branch warehouses in principal cities.

Number of Kling

Friction Saws in use
16 — among all Ryerson plants.

Jobs performed

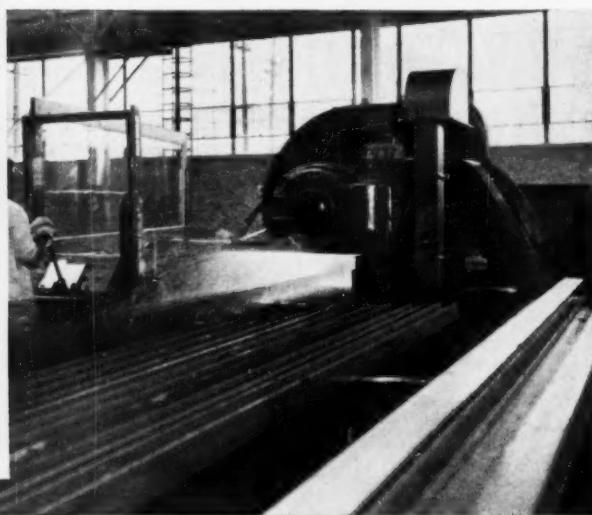
Cutting angles, bars, channels, beams.

Average Cuts Per Day

Average 520 cuts of miscellaneous items in an 8-hour day, ranging from light channel sections to 30" x 124 lb. beams.

Other Advantages

Has reduced the amount of burr, reducing time required to chip or clean the cut.



Kling HIGH SPEED FRICTION SAWS

increase cutting production FOR "THE BEST OF COMPANIES!"*

Greater cutting speed with all types of steel . . . versatile ability to cut many different kinds of structural shapes . . . cleaner cutting . . . and lower investment in initial equipment—these are some of the advantages that attract industrial plants and steel warehouses like Joseph T. Ryerson & Son, Inc.—to the use of Kling Friction Saws.

One Kling High Speed Friction Saw can handle a volume of cutting that would otherwise require several shears or other type saws. Consequently, Kling Friction Saws make possible faster cutting of structural shapes without changing set-up, than any other known process.

The reason for the exceptional speed of Kling Friction

Saws is, that they operate on a principle practically the opposite of the ordinary tool or conventional saw. Friction sawing concentrates the heat on the material to be severed, at a rate which is faster than it can absorb heat. The process is not new, but has been applied successfully for years.

* Some of the companies using Kling Friction Saws:
Allis-Chalmers Mfg. Company A. M. Castle & Company Bethlehem Steel Inc.
Douglas Aircraft Co., Inc. Kyle & Company L. B. Foster Company
Lone Star Steel Company Madson Iron Works Inc.
Jos. T. Ryerson & Son, Inc. Stephens-Adamson Mfg. Company
The H. M. Harper Company U. S. Steel Corporation



Complete Friction Sawing Information FREE! Write for Bulletins that tell you in detail exactly how Friction Saws work and what they can do in your shop to save you time and money.

KLING BROS. ENGINEERING WORKS • 1320 North Kostner Avenue, Chicago 51, Illinois

Since 1892
Kling
65 Years

...an investment in speed!



Combination Shear
Punch & Cutters



Double Angle Shears

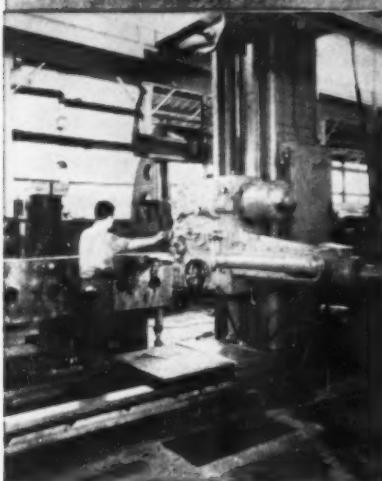
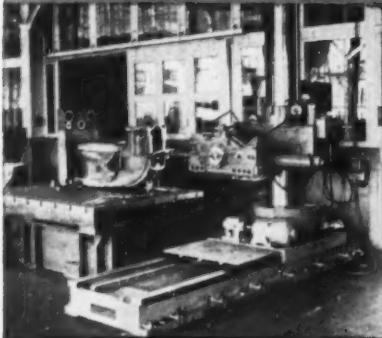


Punchers



Plate Bending Rolls

Horizontal Drilling Machines Kaukauna **AT WORK**...



Performing quick, accurate drilling operations on press frame parts—drilling, fixture boring, tapping operations on milling machine columns—drilling all four ports of a tractor frame on a repetitive production line basis—these are the types of jobs illustrated, showing Kaukauna Horizontal Drilling Machines at work. The time and labor savings are of course apparent—elimination of expensive crane lifts, reduction in handling time, inexpensive tooling.

As illustrated, there is a Kaukauna Horizontal Drilling Machine in a size suitable for any class of work from small, high production jobs to extremely large work pieces. These extremely versatile machines make for greater work simplification and may be used to advantage in your shop for driving boring fixtures, drilling, reaming, boring, counterboring, tapping and spot-facing operations.

Kaukauna builds Universal Radial Drills and Horizontal Drilling Machines in a range of sizes which meet practically all requirements in modern production practice. Write today for descriptive catalog or ask representative to call.

 **Kaukauna** MACHINE CORPORATION
KAUKAUNA, WISCONSIN, U. S. A.

Grind Drills to

Cut Faster • Last Longer
Produce More Accurate Holes

with OLIVER DRILL POINTERS

To obtain best results from your twist drills, you must use correctly sharpened drills. Twist drills machine-ground the Oliver Way assure uniformity, last from 2 to 3 times longer than hand-ground drills. The balanced cut obtained with OLIVER DRILL POINTERS means that each lip of the drill does equal work—makes more perfect holes.

Dull drills are costly—cause rejects and production lags. Avoid excessive drill costs and imperfect holes. Save time and money the Oliver Way . . . At the first sign of dullness or inaccuracy, remove twist drills from the drilling machine . . . increase their wearing life and efficiency . . . machine-grind them with OLIVER DRILL POINTERS.



Model #21



MODEL #510

OLIVER DRILL POINTERS give you the only scientifically correct and theoretically perfect drill point.

No. 510 for drills $\frac{1}{4}$ " to 3"—2-3-4 flute. Variable clearances. Variable point angles. Automatic operation.

No. 21 Oliver Bench Grinder. Hand operated for Drills No. 57 to $\frac{1}{2}$ ". Right hand, with an improved point. Attachments are available for grinding oil hole drills, left hand and other special points.

Write for our free Booklet

"How To Produce More Holes With Your Drills!"

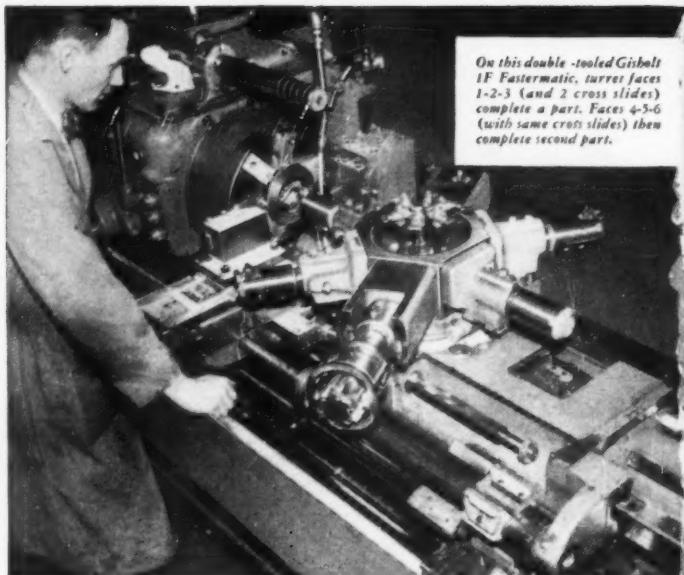
See our catalog in Sweet's Directory

OLIVER INSTRUMENT CO.

1408 E. MAUMEE • ADRIAN, MICHIGAN

MACHINE TOOLS
by OLIVER include:
AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES

**HOW
DUPLICATE
TOOLING...
AND A
FASTERMATIC...**



doubled production!

The time and unit cost for machining these cast iron pulley flanges were cut in half when the Fastermatic with double tooling took over the job.

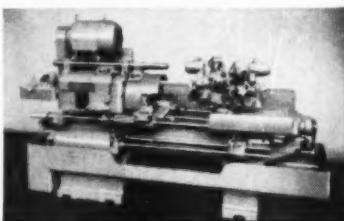
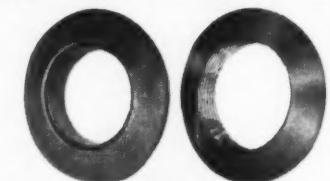
Just three turret faces were needed to complete the machining and threading on each part. Therefore, tooling is repeated on the other three turret faces so that two parts are finished with each revolution of the turret. Production is doubled over the old method . . . time lag is cut to a minimum . . . there's twice the time between tool changes.

This smart setup illustrates one of the many ways Fastermatic Automatic Turret Lathes give you greater efficiency and lower costs on a broad range of jobs. And one operator can usually handle two or more machines. Ask for the facts.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin



THE GISHOLT ROUND TABLE
represents the collective
experience of specialists in the
machining, surface-finishing and
balancing of round and
partly round parts. Your
problems are welcomed here.



Sets nuts 4 times as fast



NEW ROTOR IMPACT WRENCH pays for itself in 9 weeks

JOB: Setting hex and socket nuts in gearless drill heads. Tool used only 25% of productive time.

FORMERLY: By hand. Required 2 minutes per head. Often scored finished surface.

NOW: Use new Rotor J-2 Impact Wrenches. Time cut to 0.5 minute.

RESULTS: 4 times as fast. Savings paid for new Rotor Wrenches in 8.7 weeks. Eliminates scoring of surface.

A demonstration in your shop can show how these new Rotor tools can save you money! No obligation. Call your nearby Rotor analyst!

Gives you 2100 solid blows per minute to KO your high costs.

ASK FOR
BULLETIN
No. 41



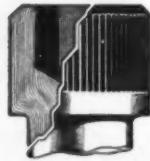
THE ROTOR TOOL CO.
CLEVELAND, OHIO

SCREW DRIVER

IMPACT WRENCH



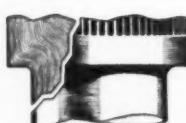
18



HEAD. Forged for maximum physical strength. Diameter and height are precision controlled—any deviation could be serious. Knurls, originated by SPS, provide easier handling and faster assembly by oily fingers.



SOCKET. Uniform depth and size assure strength and maximum torque in wrenching—extremely important in such a screw.



FILLET. Completely formed to provide maximum resistance to shear and continuous grain flow throughout length of screw.

There's much more to an UNBRAKO than meets the eye

When you pick up a socket cap screw, you don't stop to examine it—it's so commonplace.

If you did, and it's an UNBRAKO, you'd marvel at the knurled head, the uniform hex socket, the smooth shank, the precision threads, all combined to make a strong, close tolerance fastener.

Quality control—from the selected alloy steels to the finished product—makes an UNBRAKO Socket Cap Screw what it is, the finest you can buy. Write for UNBRAKO Standards. STANDARD PRESSED STEEL Co., Jenkintown 52, Pa.



SOCKET SCREW DIVISION



JENKINTOWN PENNSYLVANIA

Stocked and sold by leading industrial distributors everywhere



THREADS. Fully formed to maintain continuous grain flow and prevent shearing. Made to Class 3 fit. Controlled fillet at root of threads gives added tensile and fatigue strength.



UNBRAKO Standards—as listed in the SPS Catalog—are stocked by leading industrial distributors everywhere.

**TURN PIPE DREAMS
INTO PIPE BENDS**



Pipe, tube and structural bending is now simplified with a **PEDRICK PRODUCTION BENDER**. Heretofore difficult bends, such as offsets and off-plane bends, can now be made in production quantities at an amazingly low cost. ALL PEDRICK PRODUCTION BENDERS are complete with motor, and are equipped with automatic duplicate bending relays.

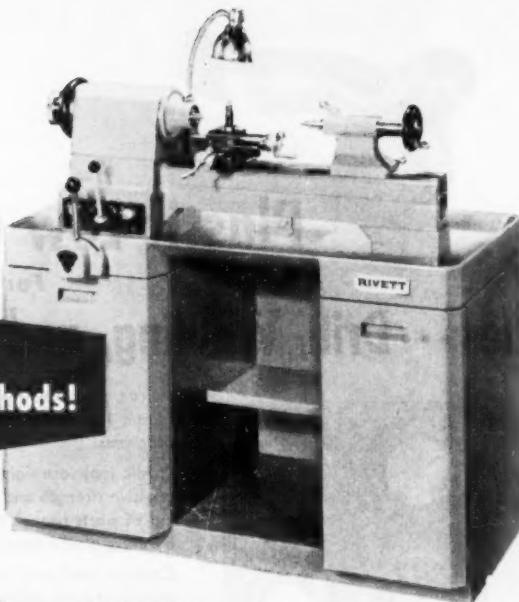
Write for Descriptive Folder. Dept. 3

Prices start as low as \$1575.00

(Motor and all Electrical Equipment included)

PEDRICK TOOL & MACHINE CO.
3640 N. LAWRENCE ST., PHILADELPHIA 40, PA., U.S.A.

**Stop using
"CUT and TRY" methods!**



FEATURES

for more precision work

- Instant selection of 90 to 3750 R.P.M. cutting speeds with convenient control and dial indication.
- Self-aligning slide rest automatically squares itself with line of centers.
- Double bevel steel ways, precision ground, provide positive centering action.
- Collets, with spacing of bearings doubled, have greater precision and gripping power.
- Lever chuck closer may be furnished with "one motion" control for collet, spindle drive and brake.

Guarantee your finish and size with a

RIVETT 918 Steelway Cabinet Lathe

Snug up to a Rivett 918* and with confidence turn, face or bore to your exacting tolerance—thrill with the knowledge that you are duplicating parts within "tenths

The speed range and tool rigidity combined with the inherent precision of the 918 assures finish and size—perfect for second operations and toolroom work.

Use a lathe consistent in size with the work to be done—save on the initial expense and continue to save with each piece produced with less effort, without rejection.

Write for bulletin 918SL. Proof of what the 918 will do for you is shown in this 20 page book.



RIVETT

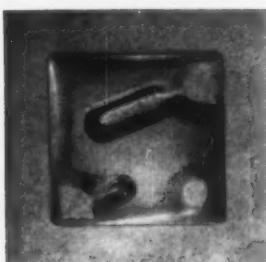
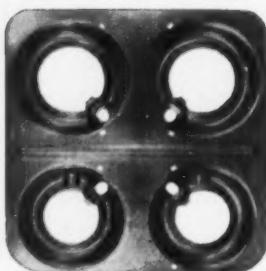
LATHE & GRINDER, INC.

Dept. MTR-B Brighton 35, Boston, Mass.

For More Precision Work RELY ON RIVETT LATHES AND GRINDERS
The Master Craftsman's Master Tools



Plastic Low Cost Tooling For Dies... Drill, Welding, and Assembly Jigs



Vulcan, keeping pace with modern tooling, can recommend plastic tooling for medium production on numerous tool programs.

Plastic tools are light in weight, have good impact, compressive strength and dimensional stability. No hand finishing of parts required as galling or marking is eliminated by using plastic form dies.

Contours and odd shapes are cast or laminated to suit individual tools, saving expensive machine and hand finishing operations.

Plastic tools, built in a matter of days instead of weeks, lower your tool costs for those medium production runs.

Our actual production figures prove plastic has a definite place in modern production.

Vulcan Tool Company's organization, building fine tools since 1916, believes new tooling developments must be proved by tool engineers. Since plastic is not a cure-all your problem should be handled by recognized, practical tool men.

Our engineering staff will recommend the correct plastic material and advise if parts of your tooling program should be in plastic.

Send a part print and your production requirements for quotation and recommendations.

VULCAN TOOL CO....PLASTIC TOOL DIVISION

Highland Avenue, Dayton 10, Ohio

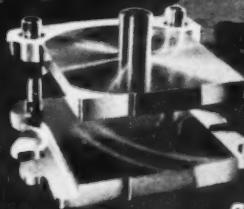


Major Vulcan Services

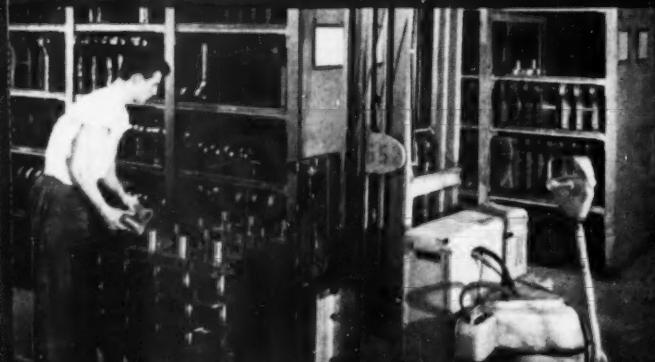
Engineering, Processing, Designing and Building Special Tools
... Dies ... Special Machines ... including the Vulcan Hydraulics that Form, Pierce, Assemble and Size, Vulcanoire Jig Grinders, Plastic Tooling.



At Danly's Chicago Plant . . .
final broaching to assure
accurate sizing and parallelism
of guide post and bushing holes



*World's fastest die set service
speeds up your tooling program*



At a Danly Branch Plant . . . complete stocks of die set components
ready for assembly to your order

Danly's new, faster service starts at the main Danly Plant in Chicago where two unique, high-speed, mass production lines are devoted exclusively to the manufacture of interchangeable, precision die set parts. Stocked by Danly Branch Plants in major toolmaking centers, these interchangeable parts are quickly assembled to make up the size and type of die set you need—and delivered to you only a few days after your order is received. Make a note right now of the Danly Branch nearest you from the list given on this page. Next time you need die sets, give your Danly Branch a call. See how they can meet your needs from stock . . . and save you time with fast, local service.



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WHY WAIT FOR SPECIAL DRILLS?

... Has them IN STOCK
for IMMEDIATE DELIVERY!

Extra Long Length High Speed Drills—Straight Shank

TAPER LENGTH WIRE GAUGE SIZES

Wire Gauge Nos.	Price Each	Length Overall Inches	Approx. Length of Twist Inches	Wire Gauge Nos.	Price Each	Length Overall Inches	Approx. Length of Twist Inches
1	\$1.00	6 1/8	3 3/4	31	.70	5 1/8	3
2	1.00	6 1/8	3 3/4	32	.70	5 1/8	3
3	1.00	6	3 3/8	33	.70	5 1/8	3
4	1.00	6	3 3/8	34	.70	5 1/8	3
5	1.00	6	3 3/8	35	.70	5 1/8	3
6	1.00	6	3 3/8	36	.70	4 1/8	2 1/2
7	1.00	6	3 3/8	37	.70	4 1/8	2 1/2
8	1.00	6	3 3/8	38	.70	4 1/8	2 1/2
9	1.00	6	3 3/8	39	.70	4 1/8	2 1/2
10	1.00	6	3 3/8	40	.70	4 1/8	2 1/2
11	.90	6	3 3/8	41	.60	4 1/8	2 1/2
12	.90	6	3 3/8	42	.60	4 1/8	2 1/2
13	.90	5 3/4	3 1/2	43	.60	4 1/4	2 1/4
14	.90	5 3/4	3 1/2	44	.60	4 1/4	2 1/4
15	.90	5 3/4	3 1/2	45	.60	4 1/4	2 1/4
16	.90	5 3/4	3 1/2	46	.60	4 1/4	2 1/4
17	.90	5 3/4	3 1/2	47	.60	4 1/4	2 1/4
18	.90	5 3/4	3 1/2	48	.60	3 3/4	2
19	.90	5 3/4	3 1/2	49	.60	3 3/4	2
20	.90	5 3/4	3 1/2	50	.60	3 3/4	2
21	.80	5 3/4	3 1/2	51	.50	3 3/4	2
22	.80	5 3/4	3 1/2	52	.50	3 3/4	2
23	.80	5 3/4	3 1/4	53	.50	3	1 1/4
24	.80	5 3/4	3 1/4	54	.50	3	1 1/4
25	.80	5 3/4	3 1/4	55	.50	3	1 1/4
26	.80	5 3/4	3 1/4	56	.50	2 1/4	1 1/4
27	.80	5 3/4	3 1/4	57	.50	2 1/4	1 1/4
28	.80	5 3/4	3 1/4	58	.50	2 1/4	1 1/4
29	.80	5 3/4	3 1/4	59	.50	2 1/4	1 1/4
30	.80	5 3/4	3 1/4	60	.50	2 1/4	1 1/4

S Set \$1—1 ea. \$1-60 Long Drills. Consists of 60 Drills ... \$40.00

E Set \$2—1 ea. Letter A-Z Long Drills. Consists of 26 Drills 40.00

T Set \$4—1 ea. 1/8" to 1/2" Extra Long Drills. 12" Overall,

5 9" Flute. Consists of 25 Drills x 64ths 55.00

STRAIGHT SHANK

12" LONG 9" FLUTE

Size Inches	Price Each	Size Inches	Price Each
1/8	\$1.65	5/16	2.25
9/64	1.65	21/64	2.50
5/32	1.65	11/32	2.50
11/64	1.65	23/64	2.75
3/16	1.65	3/8	2.75
13/64	1.80	25/64	3.05
7/32	1.80	13/32	3.05
15/64	1.95	27/64	3.30
1/4	1.95	7/16	3.30
17/64	2.05	29/64	3.60
9/32	2.05	15/32	3.60
19/64	2.25	31/64	3.60
		1/2	3.60

15" LONG 12" FLUTE

17/32	\$7.00	21/32	9.00
9/16	7.70	11/16	9.10
19/32	8.25	23/32	9.35
5/8	8.80	3/4	9.50

Taper Length Letter Sizes

STRAIGHT SHANK

Size	Price Each	Length Overall Inches	Approx. Length of Twist Inches
A-E	\$1.64	6 1/8	4
F-K	1.71	6 1/4	4
L-N	1.78	6 3/8	4 1/8
O-R	1.86	6 1/2	4 1/8
S-U	2.00	6 3/4	4 1/4
V-Y	2.14	7	4 3/8
Z	2.29	7 1/4	4 5/8

TAPER SHANK

Size	Price Each	Length Inches	Twist Inches	Shank Size	Size	Price Each	Length Inches	Twist Inches	Shank Size
33/64	\$7.15	17	13	No. 2 M.T.	47/64	\$ 9.50	17	13	No. 2 M.T.
17/32	7.15	17	13	No. 2 M.T.	3/4	9.50	17	13	No. 2 M.T.
35/64	7.70	17	13	No. 2 M.T.	25/32	10.20	17	13	No. 2 M.T.
9/16	7.70	17	13	No. 2 M.T.	13/16	12.00	18	13 3/8	No. 3 M.T.
37/64	8.25	17	13	No. 2 M.T.	27/32	12.50	18	13 3/8	No. 3 M.T.
19/32	8.25	17	13	No. 2 M.T.	7/8	13.20	18	13 3/8	No. 3 M.T.
39/64	8.80	17	13	No. 2 M.T.	29/32	13.75	18	13 3/8	No. 3 M.T.
5/8	8.80	17	13	No. 2 M.T.	15/16	14.30	18	13 3/8	No. 3 M.T.
41/64	9.00	17	13	No. 2 M.T.	31/32	15.40	18	13 3/8	No. 3 M.T.
21/32	9.00	17	13	No. 2 M.T.	1	17.60	20 1/2	15 1/2	No. 3 M.T.
43/64	9.10	17	13	No. 2 M.T.	1-1/16	18.70	20 1/2	15 1/2	No. 3 M.T.
11/16	9.10	17	13	No. 2 M.T.	1-1/8	19.80	21 1/2	15 1/2	No. 4 M.T.
45/64	9.35	17	13	No. 2 M.T.	1-3/16	22.00	21 1/2	15 1/2	No. 4 M.T.
23/32	9.35	17	13	No. 2 M.T.	1-1/4	24.00	21 1/2	15 1/2	No. 4 M.T.

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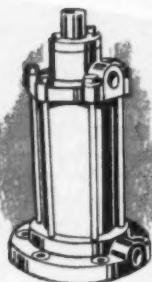
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750 SERIES NONROTATING TYPE 7 STANDARD MOUNTINGS

Eight standard sizes from 2" to 8" diameter bore. Maximum operating pressure 750 p.s.i.

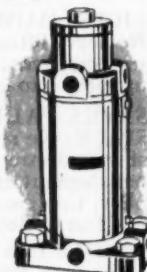
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Seven standard sizes from 3" to 14" diameter bore. Maximum operating pressure 500 p.s.i.

ROTOCAST[®] SERIES 7 STANDARD MOUNTINGS

Sizes from 2" to 8" bore; any length stroke up to 8 feet as standard. Four piston rod end types. Operating pressures to 1500 p.s.i.

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AIR AND HYDRAULIC PRESSES, Cat. 51 - COLLET GRIP TUBE FITTINGS, Cat. 200-5 - HYDRAULIC CONTROL VALVES, Cat. 200-4
HYDRAULIC CYLINDERS, Cat. 200-2, 200-3 - HYDRAULIC POWER UNITS, Cat. 200-1 - SURE-FLOW COOLANT PUMPS, Cat. 62



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KOIL-KRADLE makes available a *controlled length of slack loop* from which any machine can draw...shuts off automatically when loop exceeds machine requirements.

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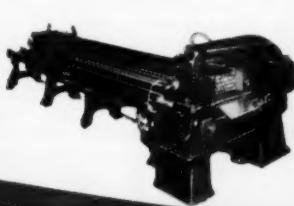
Write us about your metal cutting needs and catalog of our complete metal cutting saw line. Address: **RACINE HYDRAULICS & MACHINERY, INC., 2054 Albert St., Racine, Wis.**



RACINE UTILITY MACHINE
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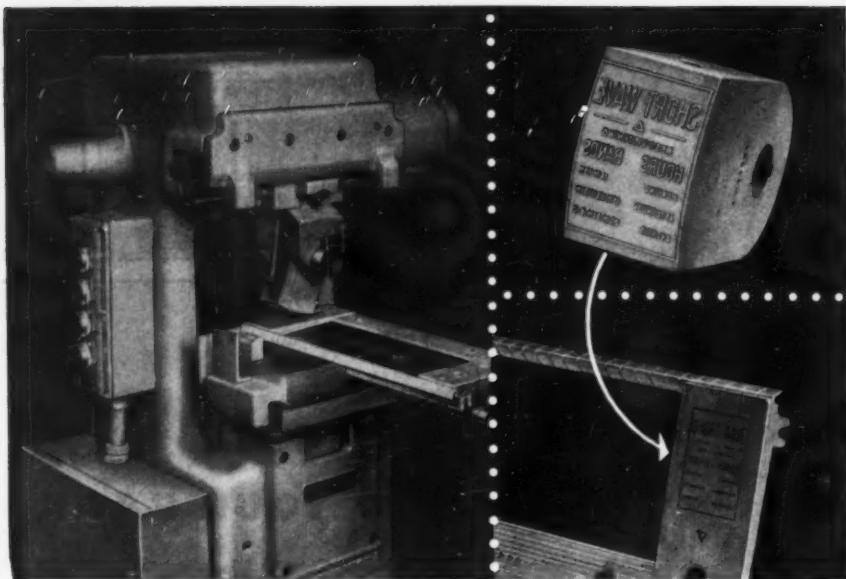
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RACINE BAR FEED MACHINE
10" X 12", 12" X 16" AND
16" X 20" CAPACITY



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Recipromatic Roll Marking

for extra deep marking and marking on fragile parts

The new Noblewest Recipromatic multiple pass roll-marking machine was especially developed for extra-deep marking of die cast parts and also for normal marking of parts that would be fractured by marking with straight pressure. Illustrated is the all-pneumatic Recipromatic Model 50P1 shown tooled for marking portable short wave radio panels. Upper right shows Rocker Marker Die and marked panel below. Here, an extra deep impres-

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ORIGINATORS OF THE ROLL MARKING PROCESS

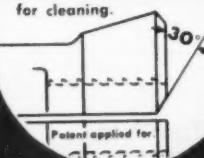
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- Replaces Kick Presses
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The New Press-Rite No. 00 is a heavy duty 2 Ton Press . . . engineered for continuous hard service . . . ideal for stamping and punching smaller parts and for secondary operations such as assembly and others. Eliminates many manual operations and reduces operator fatigue. This press will pay for itself quickly. Write for low prices and full information today.

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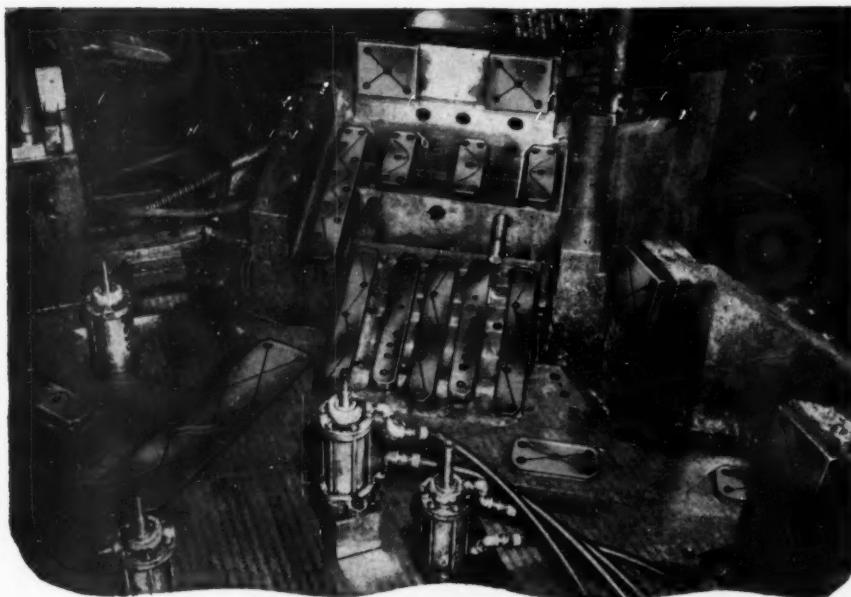
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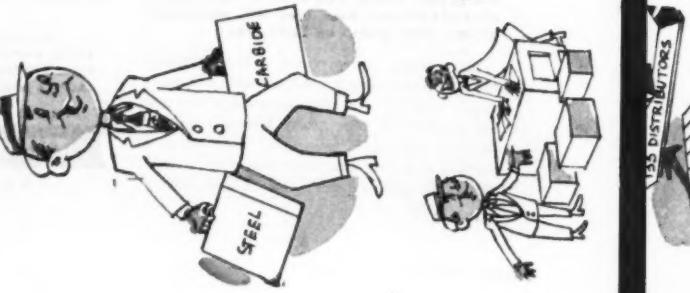
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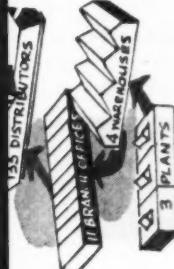
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Circulate and pump coolants where volume is essential with low head pressure

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WRITE FOR FULFLO MECHANICAL DATA BOOK on your letterhead. Please state if for Pumps, for Valves or for both.



MODEL AG3M Belt Driven $\frac{1}{4}$ hp thru
MODEL AG7M 1 Hp.
Pipe sizes, $\frac{3}{8}$ " to $1\frac{1}{2}$ "

- constant pumping action
- chips or grit cannot interfere
- spring tension packing prevents leaks
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- carbon seal, if desired
- splashproof, ball-bearing motors

Belt, motor or direct drives. Vertical or horizontal installations

Capacities: $\frac{1}{2}$ to 1 hp; pipe sizes $\frac{3}{8}$ " to $1\frac{1}{2}$ "



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PUMP AND VALVE MANUFACTURERS
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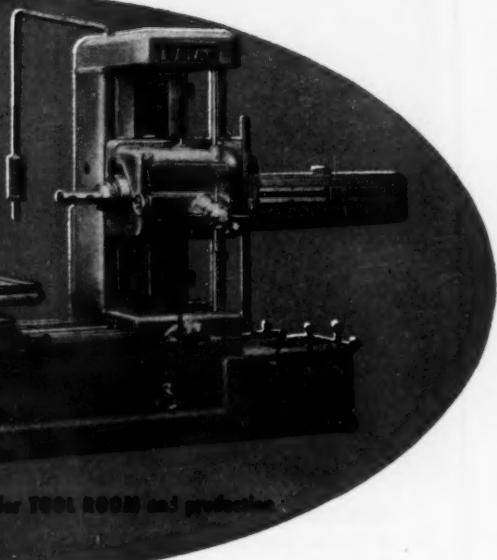
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**3" horizontal boring mill for
TOOL ROOM and production**

table top swivels full 360°

18 speeds—17 to 910 r.p.m.

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- Feed dial reads in .001"
- Heavy Type G5 in spindle



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over 75 years of "know-how" in the manufacture
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Users of the WOTAN Boring Mill find that advanced engineering and expert craftsmanship have combined to produce an outstanding piece of tool room equipment that is also well suited to long and short production runs.

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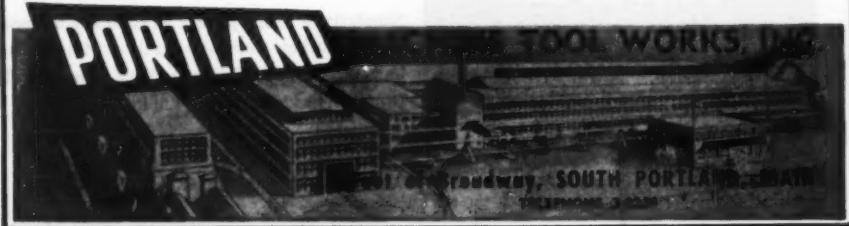
PORTLAND'S HEAVY DUTY MILLING HEAD

The PORTLAND milling head was especially designed and engineered to solve heavy duty milling problems . . . milling of armor plate, special alloys, etc. These heads are easily adapted to outmoded planers . . . converting them into powerful, modern, efficient planer-type milling machines.

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- Infinitely variable Hydraulic feed from 0 to 60" per minute
- Designed for right and left hand, horizontal and vertical operation
- Horsepower ratings available from 10 to 100

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... another MORRIS MOR-SPEED
production machine

OPERATIONAL CYCLE:

- STATION #1—Load and unload
- #2—Drill two $57/64$ " holes
- Drill four $29/32$ " holes
- #3—Spot face six holes
- #4—Ream (.9062") two holes

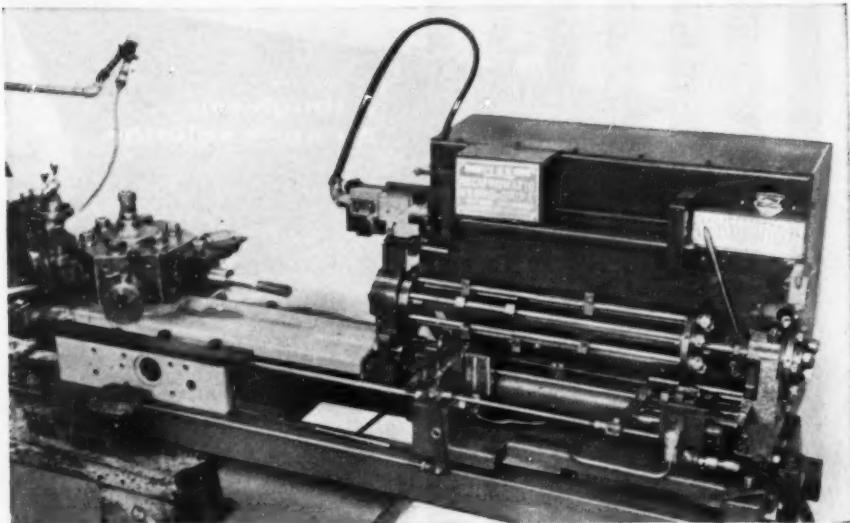
Drilling six large holes in armor plate forgings is no cinch, but when you want a finished part every minute and twenty seconds, that's a tough problem. To Morris Engineers, it was a familiar problem . . . precision drilling on a mass production basis!

The machine furnished was a Mor-Speed Four Station Vertical, using standard units to give "special machine" production and precision at remarkably low cost.

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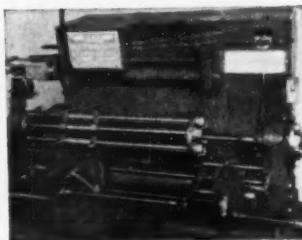


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Chips are cleared by drill automatically with drawing at intervals. Re-enters in rapid traverse to depth of cut. Deep holes are drilled faster, more accurately, with less effort.

Apply reciprocating action to any, or all, turret stations — other stations are controlled by LYNN Recipromatic Hydro-Drive to make machining cycle completely automatic.

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*so many jobs so fast,
so easily, as the
Norton No. 20, because...*

the
wheel head
tilts!



Greater versatility featured!

The Norton No. 20 cutter and tool grinder brings new speed and economy to the widest range of tool and cutter grinding jobs. It adds value to every piece of work it grinds... brings you more speed, more product value, more profit.

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Only one of the world's most complete line of grinding machines, the No. 20 is a typical development of Norton's engineering leadership. Remember — only Norton offers you such long experience in both grind-

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Why not investigate how the No. 20 can modernize and speed up tool and cutter grinding in your plant? See your Norton Representative for detailed information—and ask him about Norton cutter and tool grinders Nos. 1 and 2, and the BURA-WAY Grinder for automatic lathe tools. Meanwhile, write direct for Catalog 189, NORTON COMPANY, MACHINE DIVISION, Worcester 6, Mass. In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

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Each Stroke = $1\frac{1}{2}$ ¢ More Profit!

In three seconds flat, a WiltOmatic Power Vise will clamp work that would require 30 seconds to position and secure in an ordinary vise. On repeat operations, like grinding or finishing, WiltOmatic's fast, strong, air powered hydraulic clamping means more production, less labor per piece, less worker fatigue, for all bench operations.



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There are scores of advantages in using any products made by Lincoln Park Industries. Read these regarding the Dial Snap Gages:

- Lincoln Park Dial Snap Gages are designed to give direct reading from the measuring anvil to indicator.
- There are no bearings, levers or cams to get out of order.
- By means of its fine pitch ground thread screw attachment, the upper anvil can be adjusted within a $\frac{1}{4}$ " range.
- Even when used by inexperienced operators, Lincoln Park Dial Snap Gages present no possibility of damage by accidental shock. The indicators themselves are encased in a housing to protect them from damage.
- Because these gages have a minimum of parts to wear or be replaced, maintenance is negligible and long-trouble-free operation is assured.
- The parallel anvils are carbide-tipped.



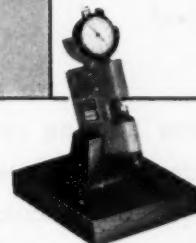
STANDARD GAGE—size range from 0 to 5" (special length gage for crankshaft inspection shown).



RETRACTOR TYPE—for gear or spline checking. Special anvils can be supplied.



SPECIAL BENCH TYPE—with carbide ball anvils, for checking pitch diameters



BENCH or COMPARATOR TYPE—for checking small parts.

Lincoln Park

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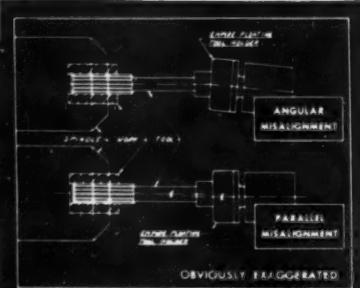
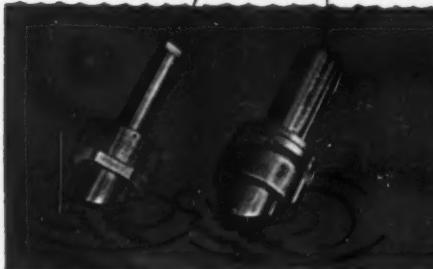
THE PLUS IN PRECISION

INDUSTRIES, INC.



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CARBIDE ROTARY FILES • ALSO FACILITIES AND SKILLED PERSONNEL AVAILABLE FOR PRECISION PARTS PRODUCTION

*They
Really
Float*



**EMPIRE FLOATING
REAMER HOLDERS**
and **EMPIRE FLOATING
TAP HOLDERS**

And we do mean float! These floating reamer and tap holders compensate for both out-of-parallel and angular misalignment and permit tap or reamer to float freely—in and out—and will not freeze under tension caused by drag.

By referring to the drawing you will note that the sleeve and shank float independently of each other—achieving a free and easy movement—a unique engineering design not found in any other floating tool.

With the Empire Floating Tool Holders you'll have no more bell mouths or over-sized holes. Holes can be reamed to close tolerances.

*Ask about the
Floating-Releasing
Tap Holder*

- that corrects for both parallel and angular misalignment
- that will not strip threads when tap is pulled out
- that permits adjustments of float to threading—right or left hand.

**EMPIRE
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MODEL 1-G
DRILL GRINDER
1/16" to 1/2" Capacity

***Nothing will do so much to reduce
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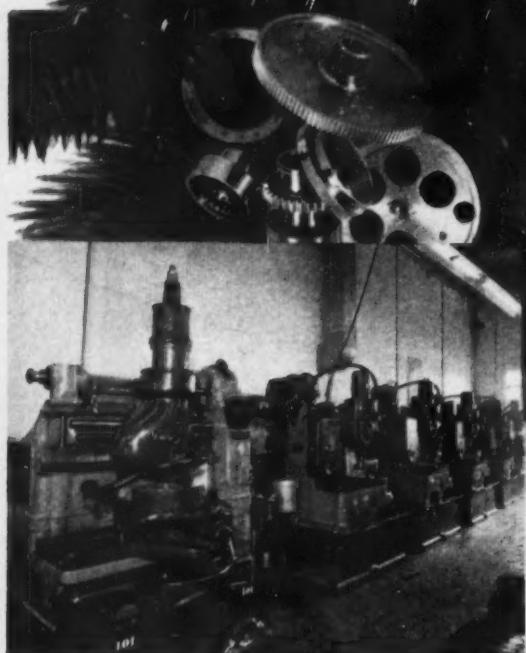


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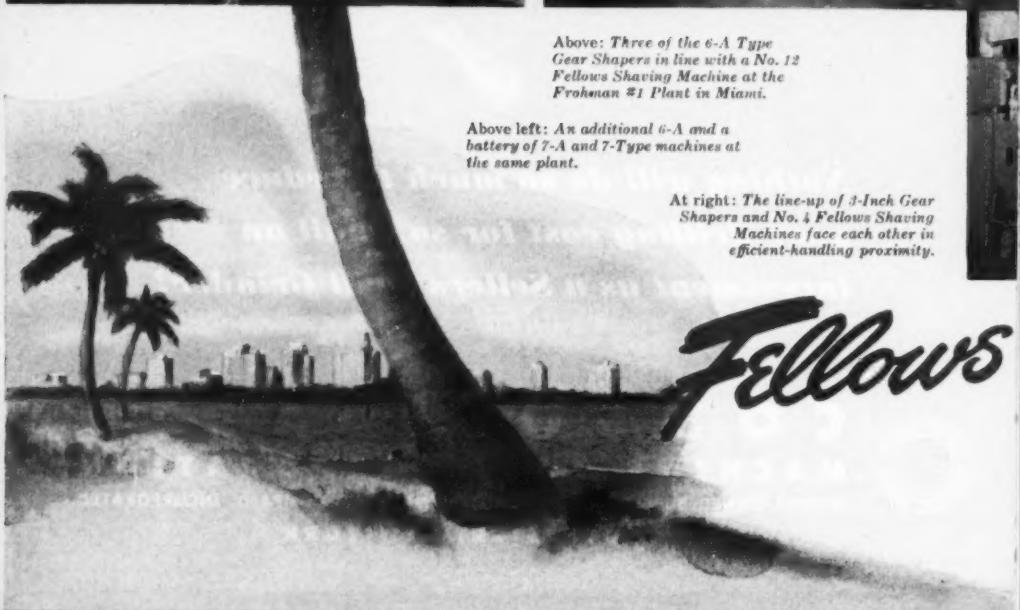


Above: Three of the 6-A Type Gear Shapers in line with a No. 12 Fellows Shaving Machine at the Frohman #1 Plant in Miami.

Above left: An additional 6-A and a battery of 7-A and 7-Type machines at the same plant.

At right: The line-up of 3-Inch Gear Shapers and No. 4 Fellows Shaving Machines face each other in efficient-handling proximity.

Fellows



GE

Pays Off under MIAMI's Sun, too!

A reputation for Extra High Quality Gears can make itself known against a Florida background as readily as anywhere 'up north'... Harry Frohman found it so when he located his Frohman Manufacturing Co. in Miami—equipped the shop with Fellows machines, toolled up with Fellows Cutters and began making the plant a prime source of good gears. Aviation and instrument gear contracts, in particular, have flowed in Frohman's direction *for very good reason.*

Samples of gears in current production with the specified tolerances, etc., are illustrated here, along with the line-ups of Gear Shapers on which they are cut. The invisible ingredient is the very low percentage of rejects which so largely contributes to cost economy.

Whether in Miami, Milwaukee, or Monterey, the Fellows Method is a sound approach to keeping costs *down* and quality *up*. For specific machine or method information, wire, write or telephone the nearest Fellows office.



TYPICAL GEAR JOBS

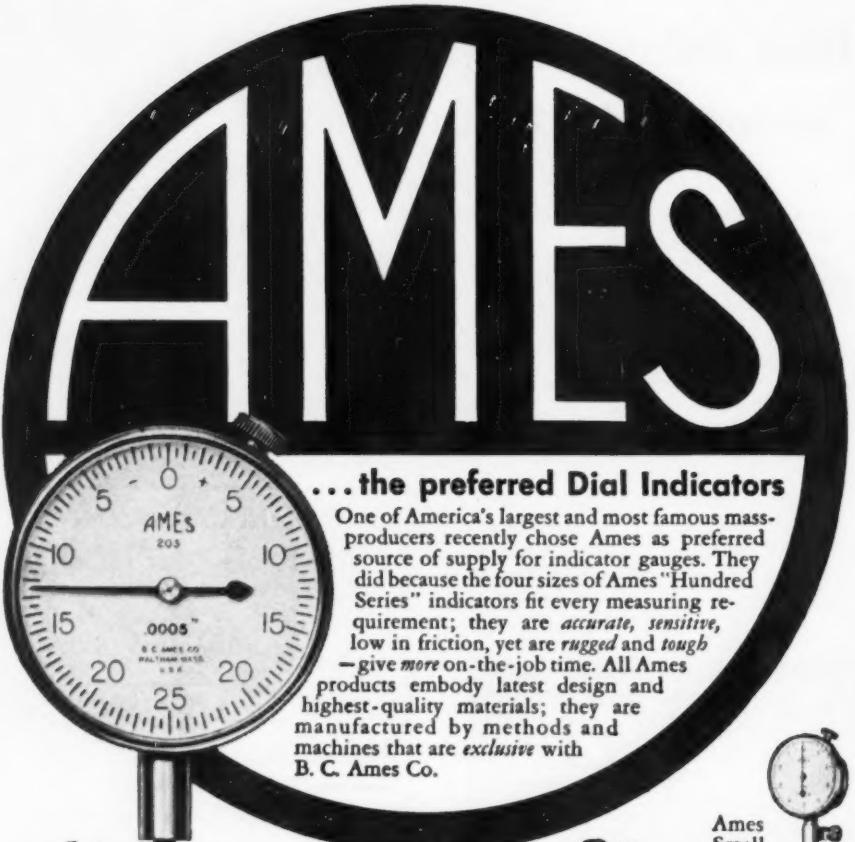
The gear items pictured and detailed here are selected from hundreds in production and scheduled for early delivery from the Frohman Plant.



Description	Ext. Gear and Spines	Ext. Gear and 2 Int. Splines	Ext. Splines and Int. Splines	External Gear
Pitch Diameter	7.375"	3.636"	4.2182"	4.833"
Diameter Pitch	16 and 20/30	9.881, 20, 40 and 11	32.64 for both	24
No. Teeth	118 and 30	30, 29, and 28	137 and 112	116
Press. Angle	25° and 30°	22½°, 30° and 20°	30°	14½°
Material	Nitralloy 135 Mod.	SAE 9310	SAE 8740	Alum. Bronze
Limits	.0005"	.0005"	.0005"	.0005" TIR
Notes	Spline cut after hardening to Rc 32-38	20/40 spline cut after hardening	All cutting after hardening to Rc 32-38	Cut @ 4 pc. loading

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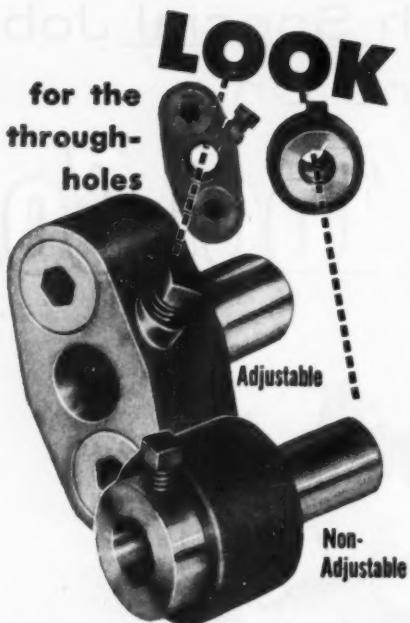


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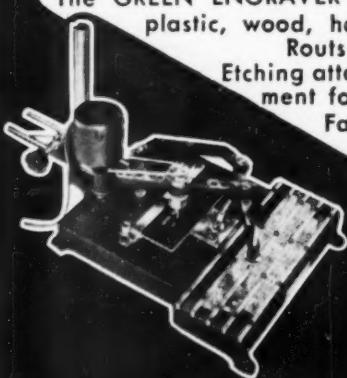
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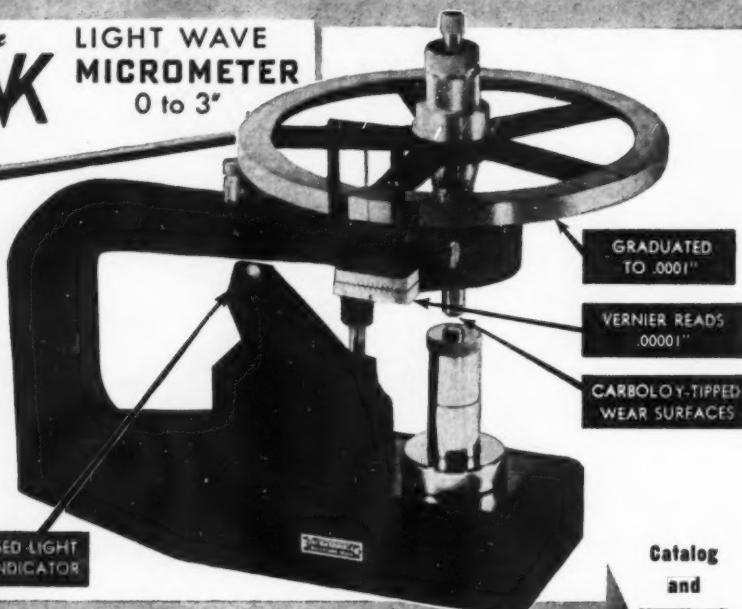
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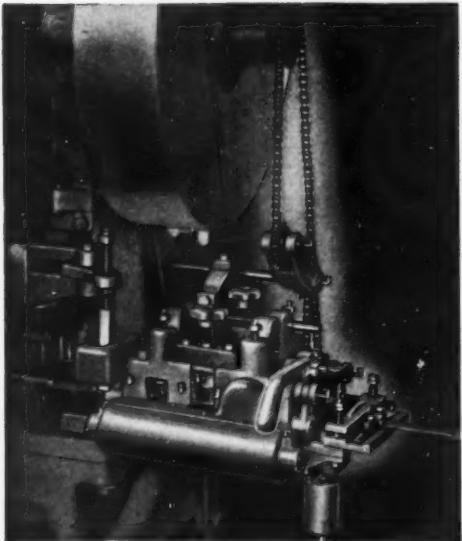
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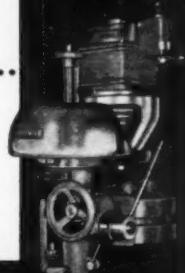
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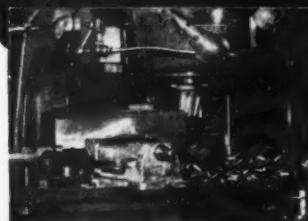
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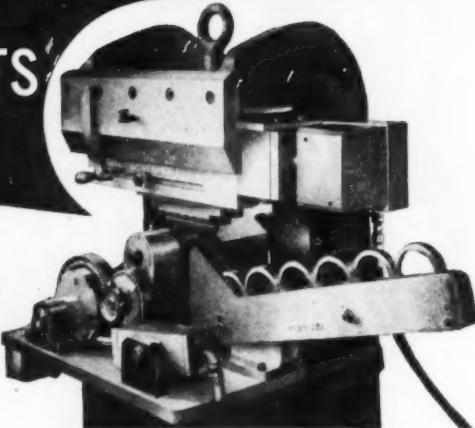
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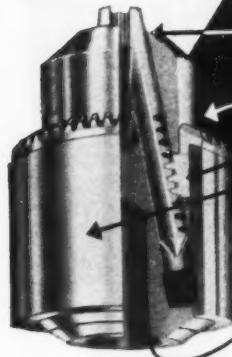
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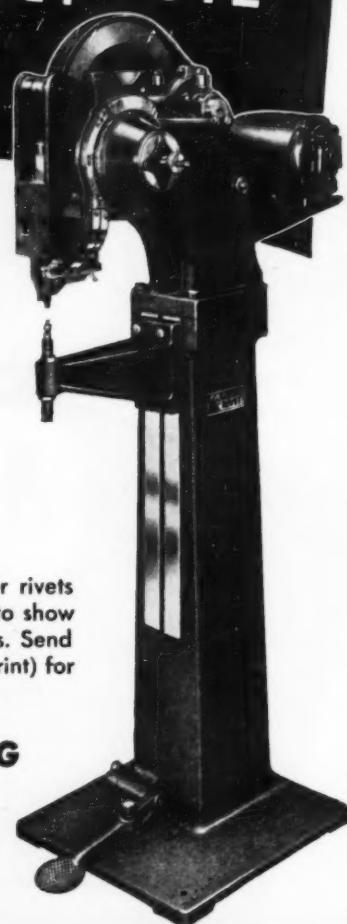
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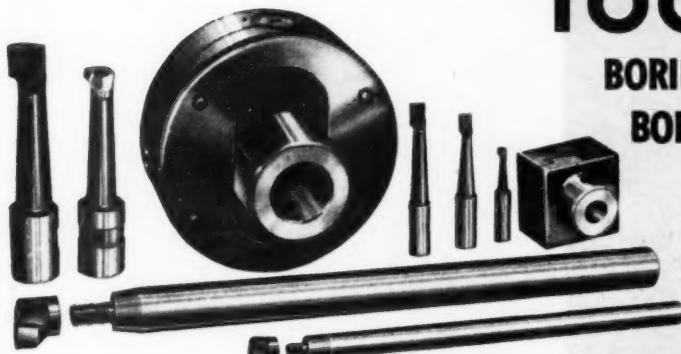
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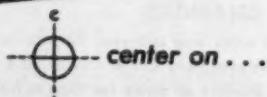
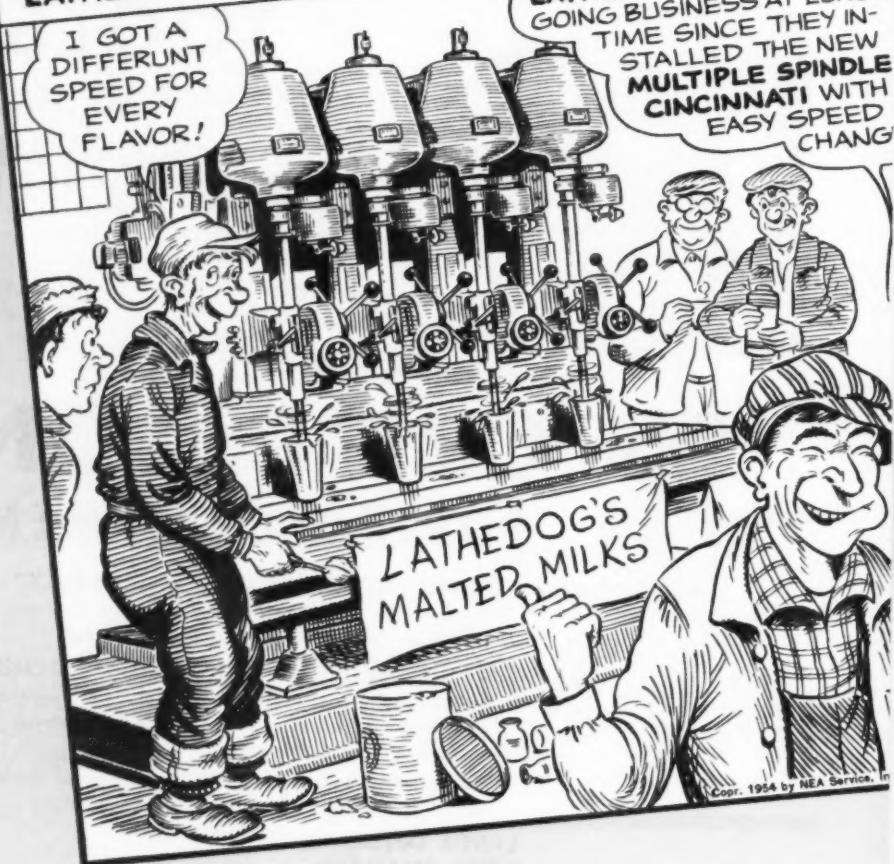
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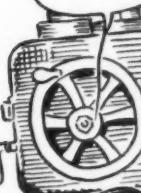


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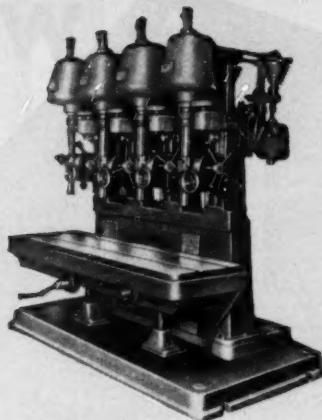
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Adjustable Spindle Heads have Dual Positioning Plates for fast, accurate set-ups that "stay put".

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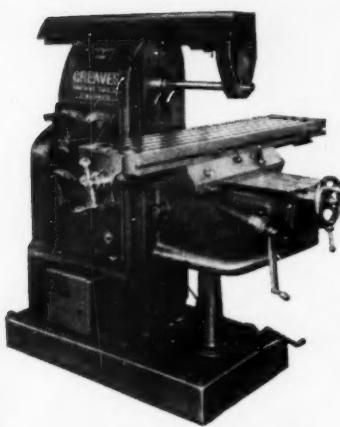
2. Locking Plate has full holes to hold spindles in place.

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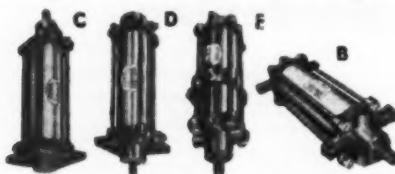


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2"	26.24	27.98	28.32	28.76	29.64	30.52	31.40	32.28	33.40
2½"	32.36	34.12	34.68	35.24	36.36	37.48	38.60	39.72	41.40
3"	35.04	37.28	37.92	38.56	39.84	41.12	42.40	43.68	45.40
4"	40.84	43.68	44.32	45.36	47.04	48.72	50.40	52.08	54.60
4½"	49.96	51.92	52.88	53.84	55.76	57.68	59.60	61.52	64.40
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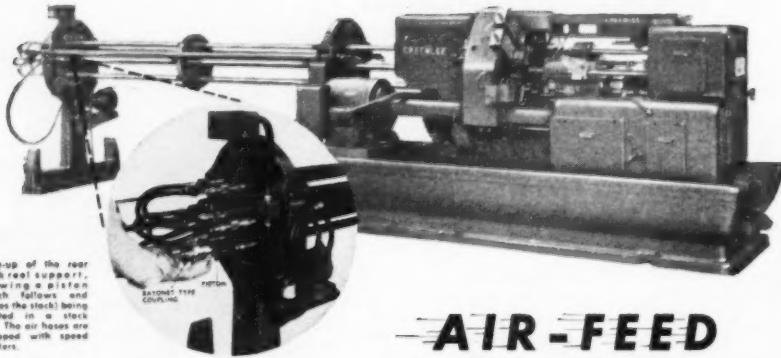
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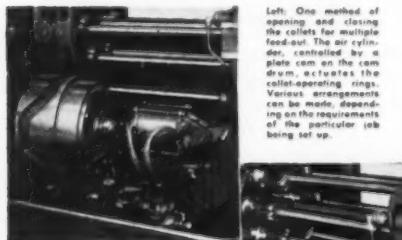
GREENLEE

Automatics

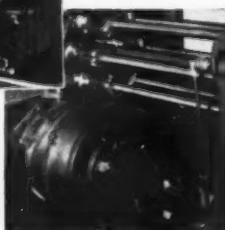


Close-up of the rear stock reel support, showing a piston (which follows and guides the stock) and inserted in the stock tube. The air hoses are equipped with speed couplers.

This method of feeding out stock was developed primarily for the many screw machine jobs that require either multiple feed-out arrangements, greater feed-out length than the conventional mechanical arrangement will permit, or for machining parts made from ground stock where pusher marks would be objectionable. It can be adapted to all 1" and 1 1/2" GREENLEE Automatics.



Left: One method of combining and closing the collets for multiple feed-out. The air cylinder, controlled by a lever, moves the drum, activates the collet-operating rings. Various arrangements are made depending on the requirements of the particular job being set up.



Right: Simplification of the feed cam drum possible with air feed, where the collets are to be opened by a conventional mechanical arrangement between the 6th and 1st operations, and closed usually against a standard feed stock stop in such cases.

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(PNEUMATIC STOCK FEED)

- FEEDS OUT STOCK TO 16 1/2"
- PROVIDES MULTIPLE FEED-OUT
- ELIMINATES STOCK SCORING
- REDUCES STOCK REEL NOISE
- ELIMINATES STOCK PUSHERS
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Above: A method used for feeding out stock during the machining cycle. The stock is fed out against an adjustable live-center stock-stop arrangement. When the metal jaws are closed, the live-center retracts and permits the stock to rotate freely and index to the next position.

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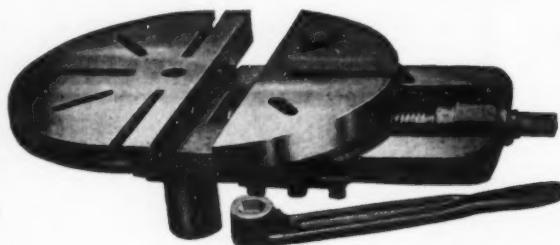
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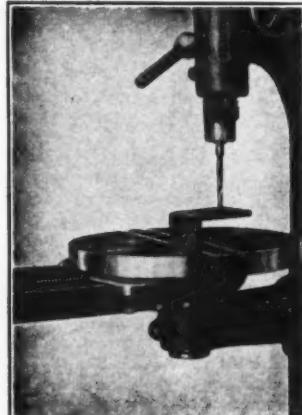
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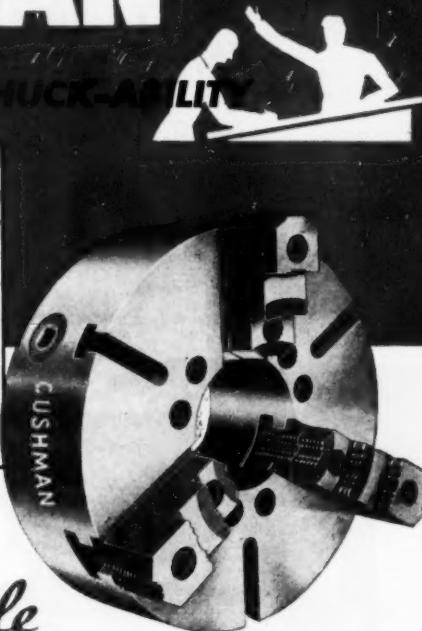
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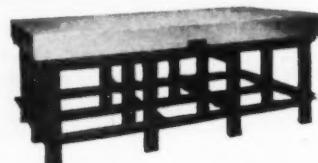
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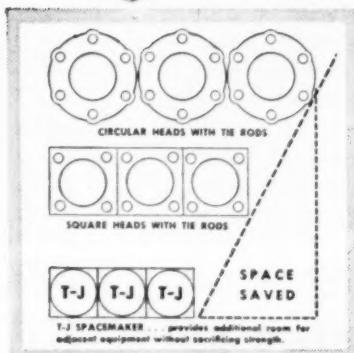
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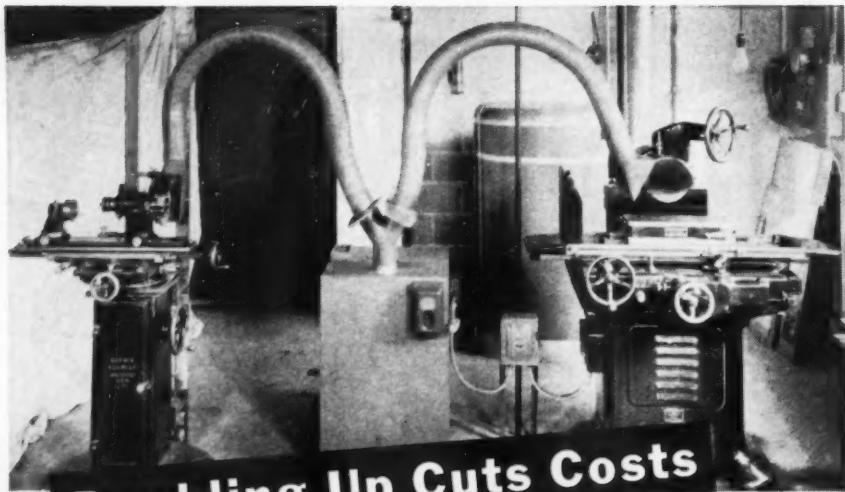
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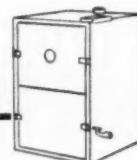
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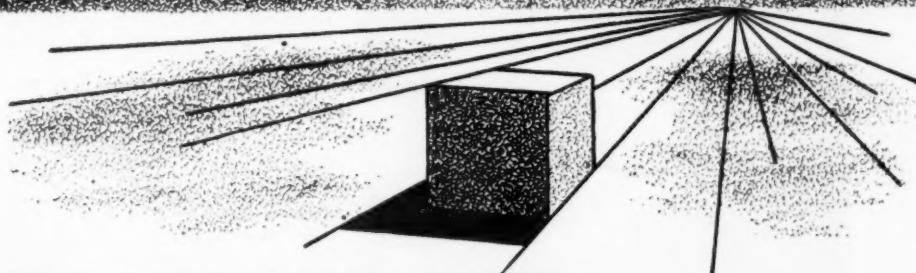
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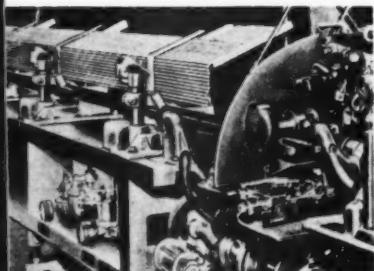
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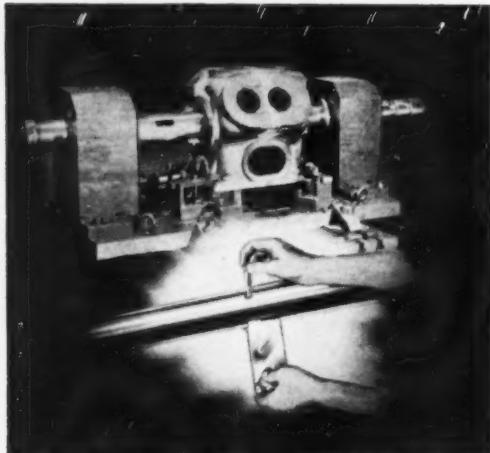
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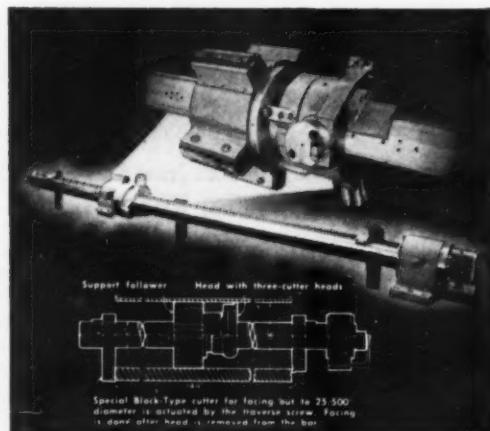
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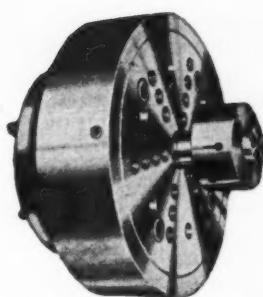
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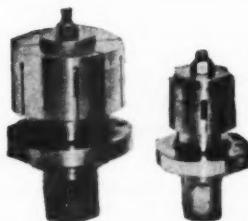
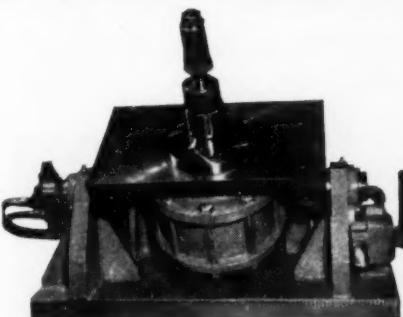


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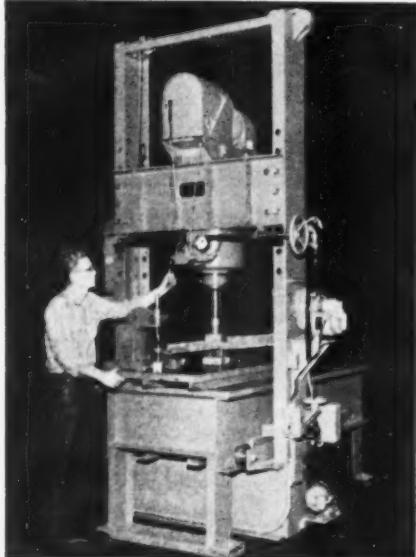


MANDRELS

All SPEEDGRIP Mandrels are made from high grade Alloy Steel, heat treated and ground to precision gages. Standard Mandrels are made in ten different nose sizes and use the same bushings as standard chucks. SPEEDGRIP engineers also design and build many special mandrels and welcome an opportunity to help solve your internal chucking problems where special equipment is required.

SPEEDGRIP CHUCK
820 NORTH WARD STREET
ELKHART, INDIANA

When the mountain wouldn't come to Mohammed



Dake Engine Company, 608 Seventh St., Grand Haven, Mich.



Tradition says that the mountain didn't come when Mohammed commanded, so he resolved the situation by going to the mountain.

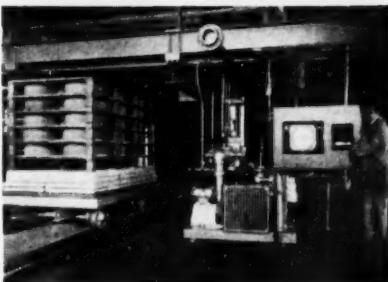
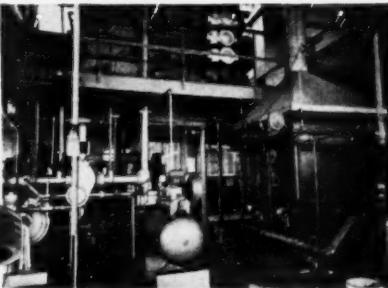
The same strategy makes the Dake Movable Frame Press unique among presses. Instead of moving the work under the press, the press is moved over the work. The frame moves longitudinally and the work-head moves laterally or vertically to any position over the worktable.

The advantages of this arrangement are many. For example, at left a Dake Movable Frame Press is used for straightening aircraft forgings. Once the forging is mounted on supports, and gauges have been placed, pressure can be applied at any desired point without disturbing the setup.

Support points can be spread to the extreme edges of the large table for work on long or irregularly shaped pieces. Work too heavy or awkward to handle manually, can be set on the table with an overhead crane, and the press moved into position.

Dake movable frame hydraulic presses can be electric or air powered, and are available in 25- to 300-ton capacities. Write for Bulletin No. 269.

From the NEW Blanchard Wheel Shop



VITRIFIED WHEELS

For more than 25 years, Blanchard has directed its efforts toward developing the best grinding wheels for Blanchard Surface Grinders. It began by pioneering with silicate bonded wheels, and then resin bonded wheels. Now, from a new, ultra modern Blanchard wheel shop come *vitrified wheels* . . . scientifically batched, pressed and fired . . . with positive control of time and temperature.

Today, Blanchard offers complete wheel service . . . silicate, resin and vitrified!

Use Blanchard wheels on your Blanchard Surface Grinder. They do a better job in less time, with less trouble and cost . . . whether your work is tough as copper or fragile as glass . . . whether it requires heavy roughing cuts or clean-up cuts with flatness to .000005" and finish of 1 micro-inch.

for Better Blanchard Grinding



THE BLANCHARD MACHINE CO.
64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

August, 1954

COUPON

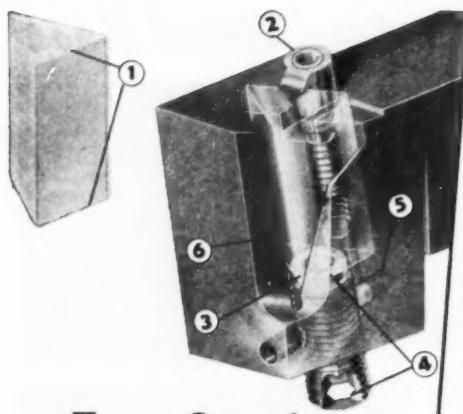
Please send free copy of *Blanchard Wheel Booklet* and *Wheel Holder Folder*. BB

NAME _____

COMPANY _____

STREET _____

CITY _____ STATE _____



For Getting Jobs Done FAST!

Kennamatic features help get the most out of a machine because there's far less downtime for tool changing when you put these multiple-edge, indexable insert tools to work.

Kennamatic inserts have Kennametal's high hardness and wear-resistance for long life. Clamped-in, they can be indexed in seconds to new cutting positions without removing or resetting the tool . . . a great time-saving feature. After

FEATURES of TOP-CLAMP KENNAMATICS*

- ① Indexable preground Kennametal* insert, provides six or more cutting edges (depending on style) before sharpening.
- ② Clamp and screw interchangeable on standard Kennamatics.
- ③ Hollow back-up screw facilitates removal of snug-fitting (frozen) insert.
- ④ Hex sockets on back-up screw for adjustment of insert from either top or bottom.
- ⑤ Nylon plug, and spring, for friction locking of back-up screw.
- ⑥ Ample clearance at front of holder eliminates shank abrasion from "chip wash."

all cutting edges at both ends of an insert have been used, they are resharpened by squaring off the ends and grinding chip breaker, if desired — no precise angles to form; no steel to grind.

Only Kennametal makes Kennamatics. Ask your nearest Kennametal tool representative to help you apply this cost-saving tooling to your production or job lot operation. Kennametal Inc., Latrobe, Pa.

* Registered Trade-Marks

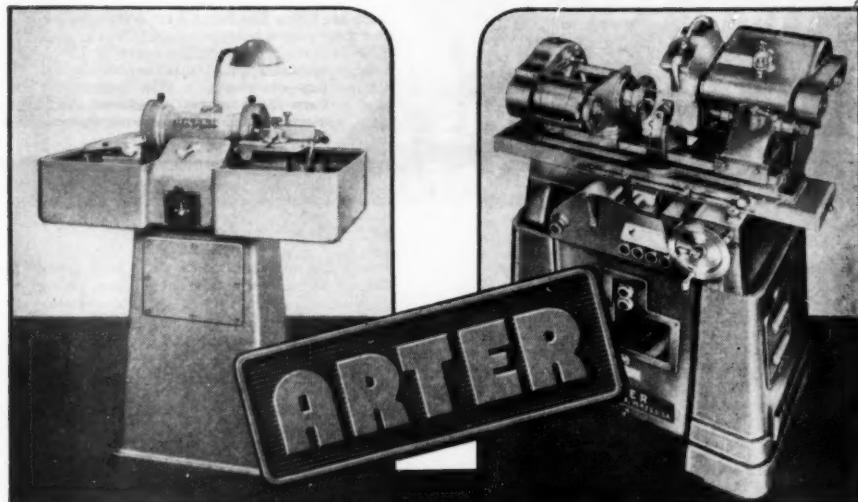
A-13



KENNAMETAL
CEMENTED CARBIDE TOOLING
THAT INCREASES PRODUCTIVITY

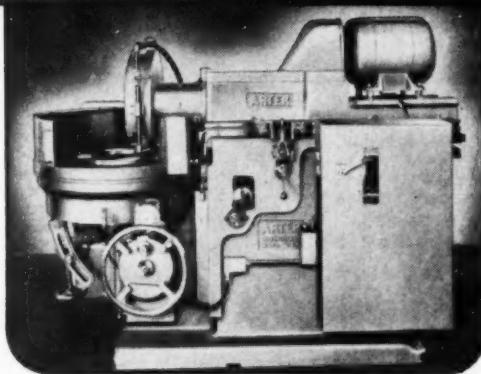
SALES
OFFICES
IN PRINCIPAL
CITIES

The Arter Family of Machines



CARBIDE
TOOL
GRINDERS

CYLINDRICAL
GRINDERS
INTERNAL
GRINDERS



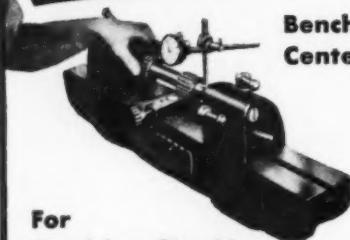
ROTARY SURFACE GRINDERS

The Arter trademark on these machines is the sign of ACCURACY • POWER • DEPENDABILITY. Tell our engineers your grinding problems. They'll find a way to lick them.

ARTER GRINDING MACHINE COMPANY
WORCESTER • MASSACHUSETTS

Agents in industrial centers of United States and Canada

Time Saving Production and Checking Accessories



For Precision Checking

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

Bench Centers

Here are three Sundstrand accessories that may prove helpful in your work. A wide range of bench centers and balancing tools are available for checking purposes. The automatic index base has proved a sound addition to many metal working machines. Write for further information.

for checking the balance of parts like gears shafts, fly wheels, pulleys, etc. Standard swing sizes range from 21 inches up to any swing desired. Length between standards ranges from 20 inches to any length desired.

Automatic Index Base For More Production



This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

In many cases, the addition of this Automatic index base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this.

Balancing Tools For Small Medium or Large Work



Sundstrand offers a complete line of balancing tools which will save their cost quickly on truing or balancing operations. Accurately sensitive and durable, they provide a simple, reliable means

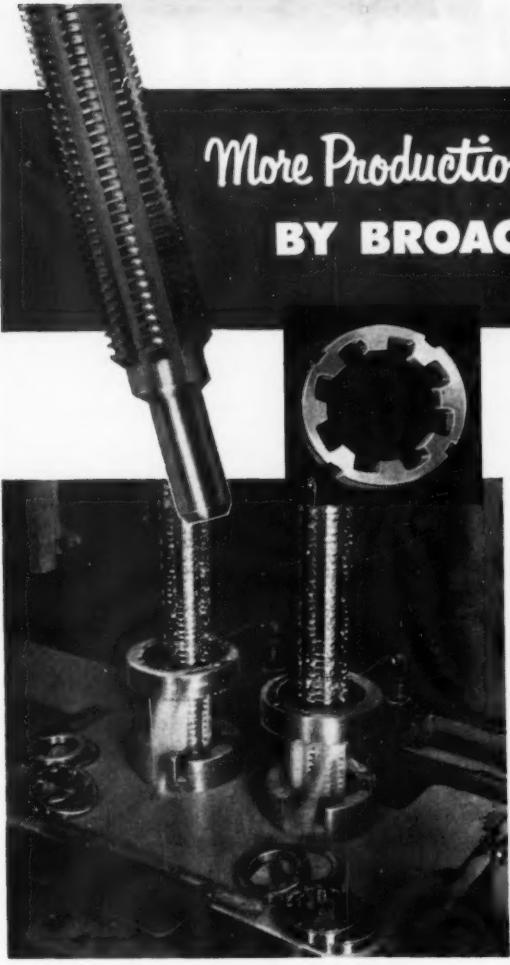
Free Data

Complete specifications are available on these three time saving accessories. Write for your copies today. Ask for bulletins 447



SUNDSTRAND MACHINE TOOL CO.

2335 ELEVENTH ST. ROCKFORD, ILLINOIS, U.S.A.



More Production, More Profit BY BROACHING ...

**REMOVE STOCK TO
PRECISION LIMITS—FAST
... ROUGH AND FINISH
IN ONE PASS!**

The scope of Broaching has broadened in recent years. Many broaching operations do precision work in far less time than other metal-cutting methods.

Continental Engineers have for years been designing all types of cutting tools and broaches. They can recommend without bias your most economical way to do the work.

For facts about increasing your production by broaching, call in your local Ex-Cell-O representative—or write Continental in Detroit for Cutting Tool Catalog.

Internal broaching of a cam ring. Note the complexity of the ring design. The steel is soft and tends to tear, yet this Continental Broach sizes the I.D. and cuts 8 splines $5/16"$ deep in one pass.

54-39
Continental



Another
Starrett® first!

NEW No. 220

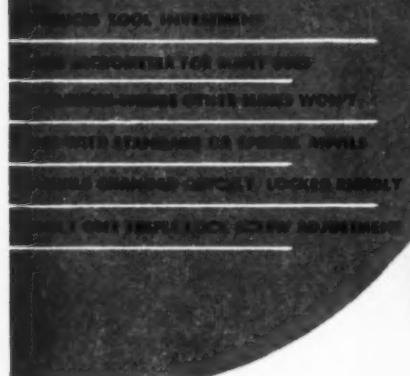
MUL-T-ANVIL
 MICROMETER CALIPER
 (Patented)



Starrett No. 220
 MUL-T-ANVIL
 MICROMETER CALIPER
 (Patented)

Range 0-1" by .001"

Furnished as shown with interchangeable round and flat anvils, without ratchet stop. Also available with Lock Nut.



New Starrett No. 220 **MUL-T-ANVIL** Micrometer is now available as a 0 to 1 inch micrometer caliper. Ask your industrial distributor to show you this indispensable new tool . . . or write for complete information. Address Dept. B.



Here is a brand new development in micrometer design . . . a micrometer with multiple interchangeable anvils created with typical Starrett ingenuity to make easy work of a wide variety of difficult measuring jobs. It permits quick, accurate measuring of tubing, cylindrical walls or work of irregular shape . . . from holes or slots to an edge . . . in places difficult or impossible to reach with an ordinary micrometer. Can also be used as height gage.

New Starrett No. 220 **MUL-T-ANVIL** Micrometer is furnished with two multi-purpose anvils, a round anvil and a double-ended flat anvil. It will also accept special anvils up to $\frac{1}{8}$ " thick — make your own at low cost or we will make them for you on special order. Anvils are rigidly held in a vise-type frame and quickly interchanged by a single lock screw adjustment.

Starrett®
 "WORLD'S GREATEST TOOLMAKERS"



ALL-STEEL PRECISION INSTRUMENTS • METAL TESTERS • REED GAUGES •
 PRECISION GEOMETRIC GAUGES • BACKGAUGES • SWIVEL SURFACE GAUGES

Featured IN THIS ISSUE

Selecting and Using Wool Felt for Vibration Isolation	131
Time Study—Selecting the Operator to be Studied	150
Special Report on Presses	212

Selecting and Using Wool Felt for Vibration Isolation. by Leon D. Gruberg. Vibration shortens the life and impairs the efficiency of production machinery and the noise that accompanies it saps the energy of workers, cuts into their morale, etc. Mr. Gruberg covers thoroughly the various problems encountered and how to solve them. Page 131

Big Squeeze...14,000 Ton Extrusion Press in Operation. The new 14,000 ton extrusion press at Alcoa's Lafayette, Ind. works will form four times the weight of aluminum previously possible in one squeeze. Large extruded shapes will some day be available for railroad, car, bus, ship, truck and trailer construction. Page 144

Selecting the Operator to be Studied. by Harold R. Nissley. This is the first part of a new series of time study articles written by Mr. Nissley, recognized authority on time study, and industrial engineering. A previous article, "How to Make Your Time Study Standards More Accurate...More Salable," appeared in the March, 1954, issue. Succeeding articles in this series will discuss: "Making the Time Study and Rating," "Summarizing and Analyzing the Data," "Setting and Selling the Standard." Page 150

Selection and Care of Ball and Roller Bearings. by W. C. Betz. In almost any mechanism having revolving parts, ball or roller bearings can be used to advantage in saving of power, repairs, and lubrication. Page 161

Kit Your Production Tooling for More Efficiency. by Harold D. Rhodenbaugh. It is not unusual to see highly paid machinists lining up at tool crib windows waiting for tools to be checked out to them. In a production shop this is prohibitive.

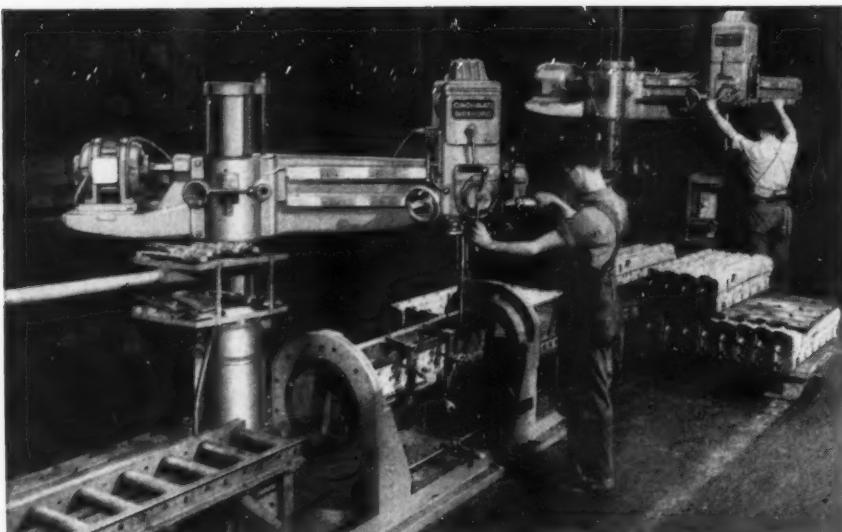
Here is shown a sound, practical kit system to save time and money. Page 164

Tramrail System Provides Efficient Handling in Foundry. by Francis A. Westbrook. The Landis Tool Co. of Waynesboro, Pa. pours some 2500 castings each month. With such a volume of output and variety of sizes it is necessary to have adequate mechanical handling facilities. This has been accomplished by using many types of equipment for materials handling such as cranes, conveyors, trucks, etc. Page 170

Plant Communications...Organizing the Flow of Ideas. by Edmund Mottershead. Many industrial communications systems still resemble the unorganized "grapevines" of the past because plant management has wrongly assumed that everything is all set now that they have reached a certain point of development. Mr. Mottershead here points out that only by a constant search for improvement can a communications program be kept at maximum effectiveness. Page 175

Some Interesting Uses for Scrap. by Clifford T. Bower. Scrap materials can be converted to useful components or other uses if a little trouble is taken to study its possibilities and provide some simple tooling which will make its reworking a paying proposition. Page 188

Built-in Automation in Dieing Machines. by W. S. Renier. In the metalworking field the concept of automation is an old one; however, it remained for the automatic dieing machine to provide a truly practical approach to this idea. Through the use of progressive dies, dieing machines have virtually eliminated manual handling, making it possible to combine extremely complex stamping and forming operations into one progressive production sequence. Page 212



**3 years of operation
with NO MAJOR
MAINTENANCE ...**



Photos courtesy Caterpillar Tractor Co., Peoria, Illinois.



Camshaft Housings for new Caterpillar DW21 Wheel-type Tractor illustrated in insert picture, showing casting before and after drilling operations.

The performance of Cincinnati Bickford Super Service Radial Drills at Caterpillar Tractor Co. has been outstanding, steady and trouble free.

On this job, including drilling, tapping and reaming, 116 holes are produced, 14 are reamed within .0005" tolerance. Caterpillar Tractor Co. also states Cincinnati Bickford Super Service Radial Drills have contributed to the advancement of their product.

Write for Catalog R-21-C.

60 YEARS OF SERVICE
**CINCINNATI
BICKFORD**



RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

AS THE *Editor* SEES IT

Don't Ignore Engineering For Sales

Recently I read an interesting news item concerning the active market for high caliber executive personnel. Seems executives are getting scarce. This in itself should not be news because truly competent management timber has always been difficult to locate; we have more wormwood than oak in our management forest. However, aside from that, what interested me in the item was the specific type of executive caliber large corporations are seeking—they appear to be heavily concerned about sales personnel and administrative officers. This is a change from a few years ago when production executives were in demand and salesmen occupied a secondary position.

Thus do times change, and thus does the emphasis in the labor market reflect economic mutations. Business is not static but swings like a pendulum in a continuous arc of varying emphasis. When the pendulum is at the bottom of the stroke all is sunlight and smiles, when it is at either extremes there is more darkness than light, more scowls than smiles. It is only to be hoped that management's understandable interest in sales personnel is not of such extreme nature that the constant need for top engineering and research talent is slighted.

When business is hard to get it is only logical that management turn to the confident-attitude-and-breezy-

smile-boys to get the orders; if it were otherwise neither you nor I would have jobs. And I do not wish to argue with sales policies or with the importance of hiring good salesmen, but wish merely to sound a warning: Sales are non-existent for the company whose products are priced too high, or whose products look like fugitives from museums rather than the end result of modern production methods and modern design. We can under-emphasize engineering and research to a point where damage is done to the product and thence to the sales volume.

When business is hard to get there is a general tendency to retrench. Sometimes this retrenching takes peculiar forms, such as: Cut down on the research, forget product testing, eliminate the replacement of tools, let's keep this process going for the time being even though it's out of date.

It is highly unwise to retrench in any department which can deliver a reduction in costs, it is short sighted to take funds from any purpose which promises to improve the product. In the emphasis for sales executives, do not ignore top engineering and production personnel.

Remember: There is a direct relationship between production cost and product price; a direct relationship between design and product acceptance.

William F. Schleicher



HYDRAULIC

DIAMOND-MISER by Wheel Trueing

Automatically develops and maintains multiple, sharp diamond facets for maximum wheel dressing efficiency.

Wheel Trueing Diamond-Miser is a tool-holder unit which is operated from the hydraulic system of the machine and which automatically provides uniformly metered diamond tool indexing.

Because the indexing is automatic, it is assured and dependable; cannot be accidentally neglected.

Because it is precisely metered, it produces multiple, uniform diamond facets which are re-sharpened in each pass of the tool, with minimum wear on the wheel.

The improvement in wheel dressing, increase in number of pieces produced between dressings, reduced diamond wear and longer wheel life, result in important economies.

The Diamond-Miser is available for centerless, cam, crank and universal grinders; single or multiple wheel mounts. May we send you our descriptive booklet?

WHEEL TRUEING TOOL COMPANY

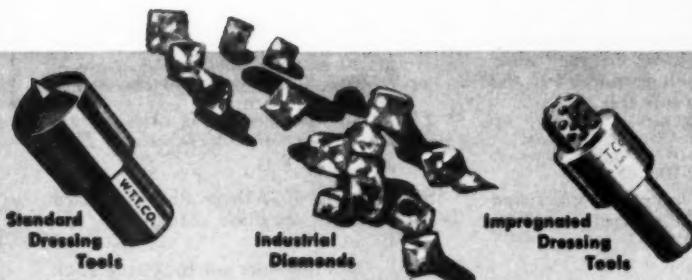
45-3200 West Davison Avenue • Detroit 38, Michigan

ESTABLISHED 1910

Offices in Principal U. S. Cities—Agents Throughout the World

WHEEL TRUEING TOOL COMPANY OF NEW JERSEY
33 West Street, Bloomfield, N. J.

WHEEL TRUEING TOOL COMPANY OF CANADA, LTD.
575 Langlois Ave., Windsor, Ont.





Information, Please!

We have been looking for some time for a small automatic or air operated peining hammer that could be used to pein the cutting edge of dies without removing the die itself from the press. In other words, we wish to leave the die in the press and place this small peining hammer over the die and be able to pein the cutting edge of our dies.

Our chief engineer has stated that he has seen this type of hammer advertised at one time or other but he cannot remember when or where. Perhaps by looking through your files you can find the company or know of one that manufactures this sort of machine shop tool.

Jack E. Werner
The New Delphos Mfg. Co.

We suggest reader Werner contact the Rotor Tool Co., Cleveland, Ohio.

We are trying to secure the name and address of the makers of an International Libbey Turret Lathe which has been furnished us by the government.

Our register is a 1951 issue, and the address of the International Detrola Corp., Libbey Division, which we believe to be the manufacturers, is given as Indianapolis, Indiana, with note to see Newport Steel Co. Letters to both places have been returned with no such companies listed, and a telephone call to the first was equally unprofitable.

Dr. Robert J. Nebesar,
Vice Pres. & Chief Eng.
Universal Moulded Products
Corp.

The Libbey turret lathe line was taken over by the Gisholt Machine Co., Madison, Wis.

son, Wis. While they no longer manufacture this line they will furnish replacement parts.

Can you furnish us with a source of supply for a combination center drill as per sketch?

You will note that the tapered portion of the drill is not straight but curved, which provides for a very slight contact with the center.

Also can you furnish a source of supply for a chrome plating outfit of small dimensions or capacity? In this we wish to experiment with hard chrome plating and determine whether we wish to use this method ourselves rather than send it out.

J. M. Clark, Pres. & Treas.
Jas. Clark

While it is doubtful if the type of drills that reader Clark desires are available as standard stock, they can be made up easily enough. Names and addresses of manufacturers of drills, as well as a manufacturer of a small chrome plating unit have been sent.

Would you please forward to me name and address of the company building the tool and cutter grinder described on page 145, paragraph four, in second column of your June, 1954, MACHINE AND TOOL BLUE BOOK?

I. A. Homrich, Factory Mgr.
Eclipse Counterbore Co.

The grinder referred to is a new model manufactured by the McDonough Mfg. Co., Eau Claire, Wis.

Sometime in 1952 there was purchased —government purchase order—we be-

lieve from your division, the book "American Built Machine Tools" by William F. Schleicher.

A member of our organization has misplaced or lost this book and must replace it. We have been unable to locate it in the book stores of this area. Information is requested as to the price of this book and whether it may still be obtained from your division.

*Ellen Gaynor Row, Adm. Assistant
Boston Sub Office, New York
Chemical Procurement District,
U. S. Army*

*Volume one is still obtainable at \$3.00
a copy, Volume two is now ready and
is available at \$4.50.*

We have been attempting to find a manufacturer of a floating tap holder with a universal collet from $\frac{1}{8}$ " to $\frac{7}{8}$ " tap size. This work is for use on a turret lathe. If you have any information concerning such a manufacturer, would greatly appreciate it.

*W. J. Manton, Chief Eng.
Tennessee Aircraft, Inc.*

Name and address of such a manufacturer has been sent reader Manton.

Wants to Reprint

Mr. McFee has shown me your letter of May 11 and a tear sheet of the article by G. L. Stevens "Practical Hints on Drilling Light Gage Stainless Steel." (BLUE BOOK, May, 1954.) I wonder if we have permission to reprint that article in an Armclo publication, "Armclo Shop News."

"Shop News" is a bi-monthly publication mailed to about 15,000 custom sheet metal fabricators who are customers of Armclo distributors. It is concerned almost entirely with custom stainless steel fabrication and providing management help for our contractor-readers. Mr. Stevens' article would be most appropriate for this publication.

We would greatly appreciate receiving permission to reprint that article.

*E. M. Rains,
Marketing Service Dept.
Armclo Steel Corp.*

We're delighted to grant reader Rains permission to reprint the article; hope the readers of "Shop News" find it of help.

Jet Power Issue Still Hot

Recently had a chance to see a copy of the Jet Power Issue of MACHINE and TOOL BLUE BOOK, and was very much impressed by its contents. Being in the business of manufacturing Jet Engine Components, we found much that was of interest to us.

We would appreciate receiving a copy of this valued book, the January Jet Power Issue, that we can keep for reference purposes.

*Sidney J. Block,
Supv. Metallurgical Lab.
Brown-Lipe-Chapin Div.
General Motors Corp.*

I would like to have the article "Machining the Aviation Gas Turbine High Temperature Alloys," by A. C. Goldberg and H. O. J. Hanzlick, January, 1954, pages 206 through 223.

*H. Golden
Westbury, L. I., N.Y.*

Spade Drills

"Reprints of this article for handy filing are available." This statement is copied from page 182 of the April, 1954, issue of MACHINE and TOOL BLUE BOOK. It refers to the article "When Drilling $1\frac{1}{2}$ " to 5" Holes Spade Drills are Economical . . . Efficient."

If it is not asking too much I would like to have, not just one, but thirty copies of these reprints. I desire to keep them on file for repeated class use. If there is a charge for these kindly let me know.

*Samuel R. Harding,
Supt. Mfg. Processes Lab.
State University of Iowa*

The reprints were late in being made this time. But thirty were sent to reader Harding with our compliments.

Please send me two reprints of "When Drilling $1\frac{1}{2}$ " to 5" Holes Spade Drills are Economical . . . Efficient."

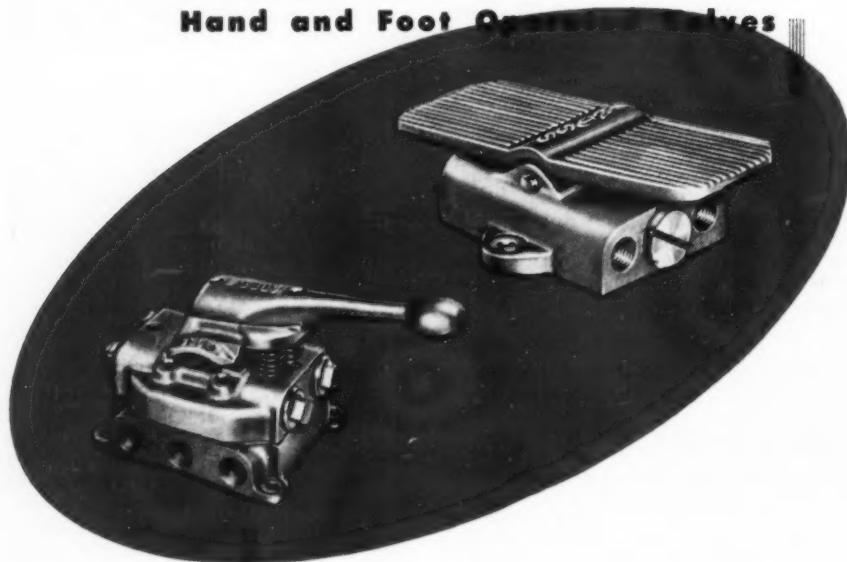
*R. W. Davenport,
Chief Ind. Engineer
Minneapolis-Honeywell
Regulator Valve Div.*

Reprints of the Spade Drill article, as well as the Jet Power Issue, have been sent.

Ross

600 and 880 Series

Hand and Foot Operated Valves



Wide variety of levers and treadles

Simple maintenance

Replacements made without
disconnecting piping

Write Dept. 108 for Bulletin 303B

Tomorrow's EnginAIRing Delivered Today



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LAST MINUTE WASHINGTON NEWS

★ ★ ★

by Arnold Kruckman
Washington Correspondent



Chief opposition against \$3.5 billion foreign aid bill (backed by both Demos and GOP) came from dozen members of Foreign Affairs; warned Ike whole program must be re-examined unless he feels that he can repudiate support for non-aggression treaty that would include reds . . . also felt Churchill-Eden talks involved this and southeast Asia adventure . . . now seems Britishers were disappointed, Winnie admitting he and Eden wouldn't be able to come to agreement with Ike. Amazing attraction prime minister has for press

corps; at least 1400 writers, cameramen, etc. present though thoroughly screened. Churchill eclipsed rest of luminaries easily . . . embarrassing way Eden was ignored; at end none of Americans made move to introduce him so 78-year-old Churchill rose and asked for a rousing cheer of welcome; ovation was tremendous.

Machine and tool work falls to the metal work and equipment division of the Business and Defense Services Administration in the Department of Commerce, located in Room 4015, tel. Sterling 3-9200, extension 3525. Ralph E. Cross, of Detroit, is director, assisted by H. E. F. Hawkins. Most BDSA divisions have the help of WOCS (without compensation), men who have been loaned to the agency by industry. At BDSA offices one hears a good deal about blueprints prepared and in process. But they explain these are purely temporary.

BDSA tries to make industry understand the need of a clear plan to protect industrial needs and assets, both in organizations and in plants if and when a war comes. One of the division directors—none of them wish to be quoted—states: "Disaster planning can only be effective if it is tailored to each organization. We have issued a booklet which should be of tremendous value to the machine tool industry as it will serve as a check list from which manufacturers can develop their own protective plan.

"It is suggested special attention be given to the subject of perpetuation of management. Although the chapter on this subject (company-wide planning) occupies only three pages, it is probably the most important facet of the entire problem. A review of the Texas City disaster, the serious damage suffered by the Norton Co. in the June, 1953, Worcester, Mass., tornado, and the General Motors 1953 fire, at Livonia, Mich., point up the need for comprehensive plans.

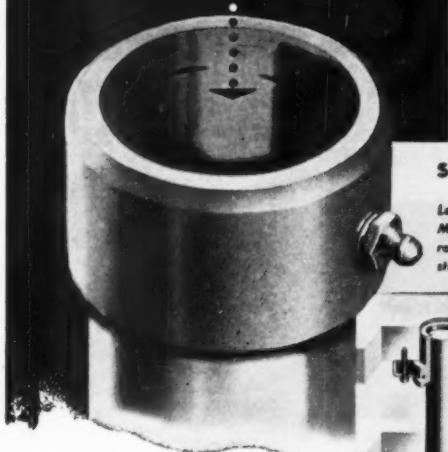
"The keystone of any plan is safeguarding the corporate interests of the company . . . a nationally known company maintains microfilm of all records, classified as essential to the company's interests, in security vaults. Planned temporary headquarter reorganization personnel has been designated, four or five deep, for all key positions beginning with the president. Provision has also been made for the continuance of the Board of Directors by surviving members. Studies of peacetime disasters have brought into focus 'absolute necessities.' As an example, the peacetime plan of an eastern abrasive manufacturer developed the following deficiencies in practice: (a) no provision had been made for fixing responsibility for administration of the plan; (b) communications were inadequate and those provided broke down; (c) command post adequately protected and remote from damage had not been provided; (d) a systematic way for keeping in touch with customers had not been set up. Furthermore, because the disaster was community-wide, essential community services, such as fire-fighting, police, doctors, medical supplies, etc., had been completely pre-empted by others.

"Detailed company-level planning, under conditions of threatened enemy attack, is vital to the security of the company and the nation. A great deal of attention is given to the study of the safeguarding of company records, including accounting, engineering, historical, insurance, legal, operating and research. Close study is made of office operations which directly support the plant production."

The NPA, at its climax, had approximately 6,900 employees. Its present successor, the BDSA, which is primarily responsible for the preparation of civilian defense, employs between 300 and 400 persons. The division into which the affairs of machine tools falls was reduced from 150 members to the present variation between ten and twelve.

Robert F. Hepenstal, one of the vice-presidents of the American Can Company, has been given the almost incredible job of cataloging the overwhelming stocks of materials of the Department of Defense. Hepenstal is expected to provide a single name, a single description and a single number for each item of supply in the Department of Defense. There are between 4 and 5 million items in the various agencies. The department has fourteen different logistics systems. Each of the fourteen systems are used to describe and number the items of supply independently of the others, even though the systems each stock innumerable identical items. In other words what may be called a pin in one system has an entirely different and alien name in another, yet is exactly the same object, for the same purpose, made of the same material, used in a similar manner and probably costs basically the same, although government prices may change with the names. Hepenstal hopes to reduce

the
BIG
difference
is
an
INSIDE
story.



Lamina
DIES AND TOOLS, INC.

Lamina

GUIDE PIN BUSHINGS

The BIG difference in Lamina Guide Bushings—lower maintenance costs, longer die life, fewer part rejects and press shut-downs—is the free-running bronze plating on long-wearing hardened steel.

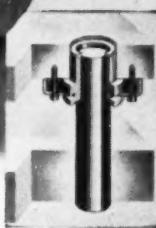
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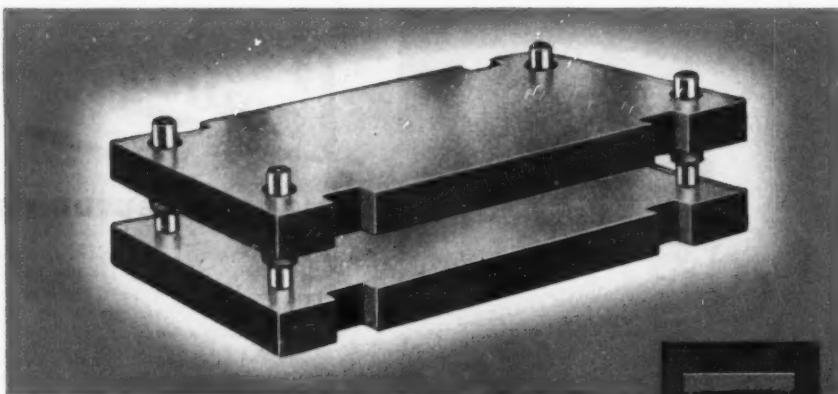


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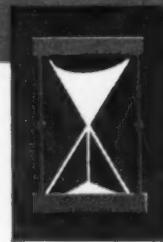


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the 4 million items by half. Efforts are being made to initiate the standardization program in all industries, of tremendous importance in the whole mobilization plan.

BDSA has a section which is known as the Communications Division headed by W. A. Vanstory. It is the business of this division to see that industry may more easily get about among government; should be of very great service to those who are interested in the mobilization problems; telephone is Sterling 3-9200, extension 4821. His Deputy is Al W. Falk.

Last winter the administrator of BDSA, Charles F. Honeywell, a California industrialist, required a swift study of various services rendered to his agency in different parts of the United States. All 25 BDSA industry divisions set to work turning out a 60-page manuscript report, still unpublished, which recites several hundred instances of services rendered by specific firms or industry groups, all of which information fits into the mobilization plan. Those chiefly studied were the Chicago Forging and Mfg. Co., National Tube, Borg-Warner, Olin Industries, Bacharach Industries, Aluminum Company of America, Owens-Illinois Glass, Northwestern Bell Telephone, American Optical, Bridgeport Brass, Continental Can, Bohn Aluminum and Brass, New Jersey Bell Telephone, Kaiser Aluminum and Chemical, Dow Chemical, General Electric, Pulp and Paper Council, many lumbermen, hardware manufacturers, hardwood plywood firms, International Telephone and Telegraph Corporation, Paramount Oil Burner Corp. and others.

The Reciprocal Trade Act, which has a bearing on mobilization, and which has been under a great deal of discussion, expired in the middle of June, and was renewed for another year at the request of the President. The prime argument was that its renewal will enable the government to procure both from Japan and, in a lesser degree, from other Asiatic countries, important volumes of raw materials that are required in the event of large-scale mobilization. Tin, from southeast Asia, was particularly an urgent need. It comes not only from Burma and Indonesia, but it is obtained from other parts of Asia. The Senate was told that if we should block the proper supply of tin we might find ourselves in trouble.

Sen. George W. Malone of Nevada, a raw metal- and mineral-producing state, was the chief champion for the plan to limit the Reciprocal Trade Act to one year. Malone, for a long time, has fought to restrict imports to those things which we need, and to prohibit the importation of those things which we do not need. There is a strong group in this country who urge that we practically allow complete free trade and with it permit the entrance of immigrants without any restrictions. This group has its main champion in R. C. Hoiles, who owns a chain of newspapers which he calls the Freedom Newspapers.

Steelmakers have been predicting that recent price advances would have little impact on demand. Average increases of \$3.00 a ton have been the rule, to help offset higher costs from new labor contracts.

Chemical business is starting an upward swing. Annual sales of Manufacturing Chemists Association is up in the \$20,-



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000,000,000 range, more than four times as much as pre-war 1940. Union Carbide & Carbon Corp., a leader in the field of alloys and new metals, as well as chemicals, is preparing to build a 7,500-ton titanium plant with its own funds, as soon as it gets the government go-ahead. At present over \$4 a pound prices, this would add more than \$60,000,000 to annual sales volume.

For estimates of true depreciation of privately owned industrial facilities built to produce military hardware, such as tanks, ammunition, etc., one must look to the military, as a result of a recently formulated policy for the military services by the Defense Department.

Claims for unemployment compensation for the past eight months are at their lowest point now (though double last year). Forty-two states shared in this decline, due, in part, to a reduction in layoffs in the textile, furniture, clothing, mining, machinery and fabricated metals industries.

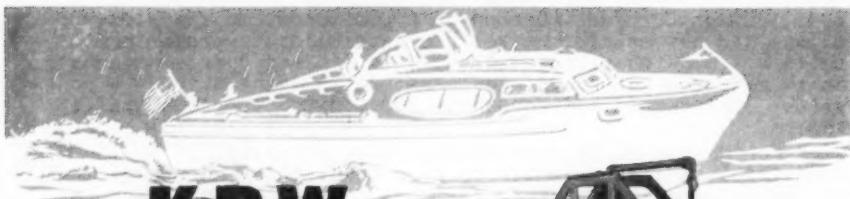
Applications for federally insured home improvement loans hit 150,000 for June, an increase over May, despite barring of "luxury" items in a Senate ruling. Dopesters say it is a healthy sign, showing an ample supply of mortgage money and a building industry geared to production. Inventory policy will have a lot to do with the shape of the business curve in the months to come. Manufacturers have reduced stocks 2½ billion in nine months. . . production down 9% below last year's high and unemployment double a year ago (63,000,000 predicted) is having a tendency to hold inflation down. . . food bill for John Q. going down slightly, steadily.

Uranium bargaining with Belgium underway. Our 10 year agreement on Congo ore runs out this year. They want atomic know-how for generating power. . . if Congress relaxes law to ok sharing of industrial information, they may get it.

An average of 9.6 cents has been given 2,000 tool and die workers and toolroom machinists in 70 Chicago area shops under contracts with the International Association of Machinists (AFL). Also granted are six paid holidays a year and after 10 years in most shops, three weeks of paid vacation, and in some after five.

The successful business executive needs time to think and plan, and to get this time he must develop a responsible staff to assist him, according to a new booklet by the Small Business Administration, highly recommended by those in the know. The publication, *The Small Manufacturer and His Specialized Staff*, is Number 13 in SBA's Small Business Management Series, and was written for SBA by Donald R. G. Cowan, Professor in the School of Business Administration at the University of Michigan. The booklet is available from the Superintendent of Documents, Washington 25, D. C. for 20 cents.

"To find time to meet new and more perplexing problems arising in a growing business and to handle them capably," the booklet says, "it is necessary that the chief operating executive fortify himself with assistants who have specialized training and natural abilities to effectively handle the different phases of the top executive's responsibilities—thus help relieve the chief executive of routine decision making. The chief executive's job is to evaluate, plan and combine."



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How's BUSINESS?

WASHINGTON . . . Business activity generally follows the usual seasonal patterns, being characterized by mixed trends. Consumer spending has been stable, due to a continuing steady rate of after-tax income.

Construction figures continue to increase over 1953. The first five months of '54 showed a gain of two per cent over the same period of last year. May, alone, was up 4 per cent from the corresponding month last year. Both private and public construction contributed greatly to the industry's boom.

The U. S. Dept. of Commerce reports that private residential and nonresidential construction is up from 1953. Commercial building has been most salient in nonresidential building activity. Public utility construction is a little ahead of 1953, but farm building is lagging behind.

Public construction gains have been prominent in the building of educational and other nonresidential units, highway, sewer and water and other public service enterprises. However, public residential building, military, and conservation-development construction show considerable declines.

Fuel prices show a seasonal drop, and apparel continues its gradual decline. Higher prices for food, rent, medical care and other personal services have been noted, however.

Steel ingot production shows a loss from the first half of 1953. This has re-

sulted from a drop in consumer expenditures for durable goods and expenditures for producers' durable equipment, and from the decline in government purchases.

The first five months of 1954 saw the steel operating rate ranging between 68 and 75 per cent of capacity on a monthly basis, with an average of 71 per cent. Steel ingot output equaled 36.8 million short tons, an annual volume of 89 million tons. This was 24 percent below the January through May period of 1953.

Steel inventories have been reduced, owing to the fact that the decline in steel output has greatly exceeded the decline in steel consumption. It is believed that consumption is currently at least as high as in 1952. Fabricated metals production and new construction activity accounted for the bulk of steel consumption.

The construction industry and container manufacturers are the steel industry's biggest customers now. Shipments for export are off 11 per cent from last year. The automotive and machinery industry takings have declined one-fifth. Agricultural machinery steel purchases have shown a greater drop than those of industrial machinery.

The output of railway cars and locomotives was cut back heavily, but the use of steel for maintenance of rails and equipment remained steady.

WASHINGTON . . . Federal spending cuts for the fiscal year beginning July 1 are predicted to be less drastic than those of Fiscal '54. Additional proportionately large reductions forecast last January may be deemed unnecessary, owing to the big cut made in the year just ended.

Through the prodding of Treasury Secretary Humphrey and Budget Boss Hughes, the military and all other government offices have increased economy much more during the past year than was anticipated last January. This

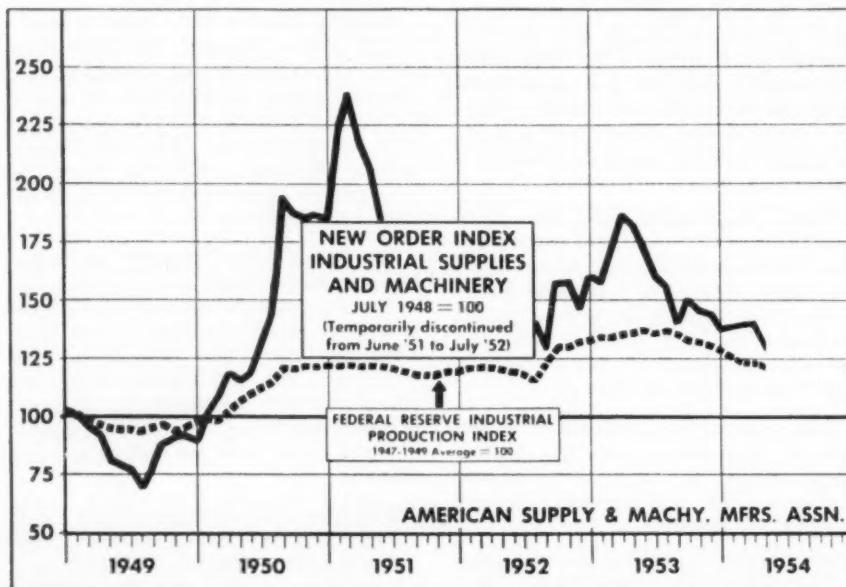
PITTSBURGH . . . The new order index of industrial supplies and machinery dropped for the first time this year. The American Supply and Machinery Manufacturers' Association reports the new order index for April at 131.9. The index has increased steadily since December 1953, reaching a high of 141.5 in March. The index measures the flow of orders received by Association members, who are manufac-

probably will mean that government expenditures in the next 12 months will be allowed to remain at present levels and will still meet budget estimates for the coming fiscal year.

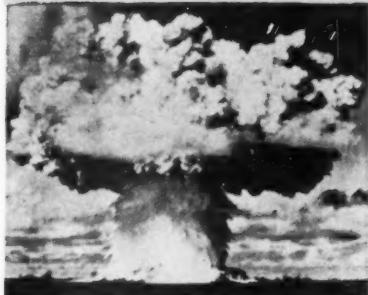
NEW YORK . . . Temporary summer jobs for vacationing students are scarce this year, and low-paying jobs which were turned down last year are being snapped up now by students who have learned to be less exacting in their wage demands.

Many employers are spreading the

turers of production, operating and maintenance supplies selling to industry through industrial supply distributors. The value of orders received during April 1954 was almost 32 per cent above the base month of July 1948. This compares favorably with the Federal Reserve industrial production index which has declined uninterruptedly since July 1953 and remains at 123 for the second consecutive month.



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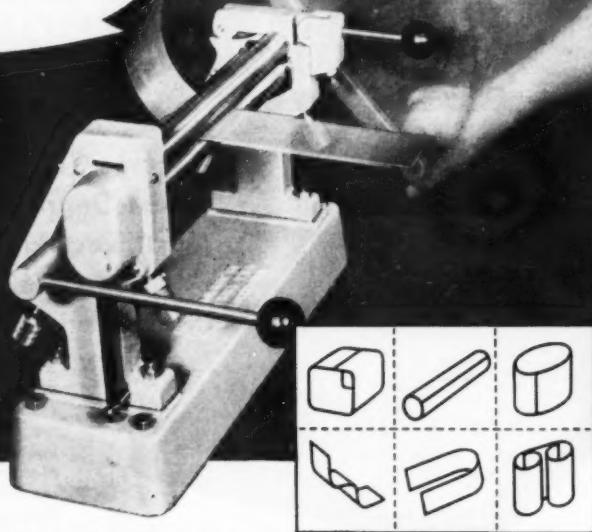
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extra work load caused by vacations among their present staffs. Others are recalling furloughed workers to help out until the regular employees return.

Neither are permanent jobs for new graduates as plentiful as last year, according to Wall Street Journal reporters who made a check of employment agencies. While some specialists, such as engineers, chemists, and accountants, are being offered work, there is little available for students trained in liberal arts, law, radio and TV, journalism, business administration and personnel.

On the executive level, however, the employment situation is less strained. According to W. H. Megary, managing owner of Buttrick & Megary, Philadelphia, there is a greater demand for really good first and second level executives today than at any time in the last decade.

Several reasons are offered for the executive shortage. As the economy expands new opportunities are realized. A slowdown in executive development resulted within many corporations when promising young men went off to the Korean War, and before that to World War II. Administrative requirements have been increased by the stiffening of competition. Concerns have been forced to search out executives who excel in cost-cutting and in sales. This is perhaps the most important reason for the availability of top flight positions.

WASHINGTON . . . Ways to smash bottlenecks in loans and government contracts for small businesses were considered at a recent meeting of the Small Business Administration's national council of consultants.

In outlining projected plans for the future of the Administration, Wendell B. Barnes, administrator, said that there will be greater emphasis on assisting small firms to get sub-contracts from

large prime contractors, and that the program of contract procurement assistance would be intensified among other government agencies, as well as with the armed services.

The Administration intends to put more stress on the production assistance program, designed to provide a clearing house of ideas for new products and new uses of established products, and guidance on technical aspects of product development.

The production facilities inventories maintained by SBA's field offices are now being mechanized and simplified as a prelude to expansion. At present the facilities of approximately 20,000 small firms are kept in these files and are used as a basis for referring contract bid information. This number will increase to 100,000 or more if present plans are carried out.

The national council of consultants recommended to Barnes that he delegate to the regional offices authority to approve loans up to \$50,000 in cases where there is at least 25 per cent bank participation and at least one-half of this participation represents new money. Adoption of this recommendation would mean that approximately one-half of all loans made by SBA would be made in the regional offices.

CHICAGO . . . The Regional Advisory Board has revealed that Midwest shippers estimate their third-quarter freight car requirements to be 6.2% less than last year. An expected 20% drop in loadings of autos and trucks and a 15% decrease in iron and steel shipments account for part of the predicted loss.

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Selecting and Using Wool Felt For Vibration Isolation

By Leon D. Gruberg

VIBRATION and the noise that inevitably accompanies it may well be the unseen marauders waging a winning battle against production workers and maintenance engineers and against the efficiency of production machinery. Not only does vibration shorten the life and impair the efficiency of production machinery, but the noise that invariably accompanies excessive vibration saps the energy of workers, cuts into their morale, increases absenteeism and personnel turnover, and, unless corrected, increases the maintenance bill not only for the machines themselves, but for the floors on which they are mounted and the buildings in which they are installed.

Leaving aside for the moment the question of structural engineering and the redesigning of reciprocating machinery to eliminate vibration, noise can be reduced by either suppressing or damping the vibration itself. For example, a machine can be effectively sound-proofed by completely surrounding it with sound absorbing material. Obviously this is not practical, so walls and ceilings are sound-proofed. The

mechanical transmission of vibrations also can be effectively overcome by using felt mounts under machines, a procedure which is more economical than sound-proofing and which is being increasingly resorted to by maintenance and production engineers.

Felt is an excellent medium for isolating a machine whose vibrations are transmitted to surrounding areas. When the proper load per unit area, felt pad thickness and felt type are used, a remarkably high isolation efficiency is obtained.

How to Eliminate Vibration

Where it is not practical to eliminate the cause of vibration through improved design of unbalanced rotating or reciprocating components of a machine, couplings, shafts, etc.,—the originating source of the vibrations—the machine itself, or its components, may be isolated by means of resilient or anti-vibration materials, such as felt pads.

Unquestionably the most effective way to reduce vibration and noise is to mount power driven machinery on vibration absorbing material. Through

the years a wide variety of materials has been used for this purpose, including wood, paper, rubber, cork, springs, etc. In recent years, however, wool felt has supplanted these other materials and has become most preferred by plant engineers because of its economy, ease of application, durability, efficiency, lack of maintenance costs, and because it can be engineered to meet specific problems.

Noise can be attacked from a number of fronts, each one capable of effecting significant reduction and control. Machine design and layout, as well as product processing and plant maintenance, are important factors to consider in initiating a noise reduction program.

For example, rotating or reciprocating parts should be accurately balanced in the design stages of machine construction. Moreover, pounding shafts and clanking rods, too often a source of uncontrolled vibration, make their contribution to noise because of over-liberal bearing tolerances.

Aside from changes in structural de-

sign, the substitution of non-metallic gears for metal ones can likewise cut down noise and reduce maintenance costs. The over all noise level in a plant may also be attacked from the standpoint of machine layout. Make certain that vibrating machinery is not mounted on structural beams capable of transmitting vibrations and noise to areas remote from the actual location of process machinery.

In product processing, the hopper into which raw material is fed—if of metal—can be a source of disturbing and unnecessary noise, as can be the container into which finished products are dropped. Here noise can be overcome by lining such containers with non-metallic material.

Proper plant maintenance, which includes automatic or scheduled lubrication, can also make for reduced noise and prolong the efficiency of any machine. Lubrication of remote or inaccessible parts can be accomplished easily with long-wearing felt wicks. Maintenance also means periodic tightening of

Nearly all of the machines pictured here, in the Rotary Division's Turning Department of the Utica, N.Y., plant of Chicago Pneumatic Tool Company, are mounted on wool felt.



a machine and replacement of worn parts, both to prolong machine life and to reduce noise.

The Need for Vibration Isolation

The need for vibration isolation can be demonstrated in a number of important ways. Properly engineered, vibration isolation preserves the life of power driven production machinery, increases and helps maintain production goals, and decreases maintenance costs. Uncontrolled vibrations have been known to severely damage factory buildings.

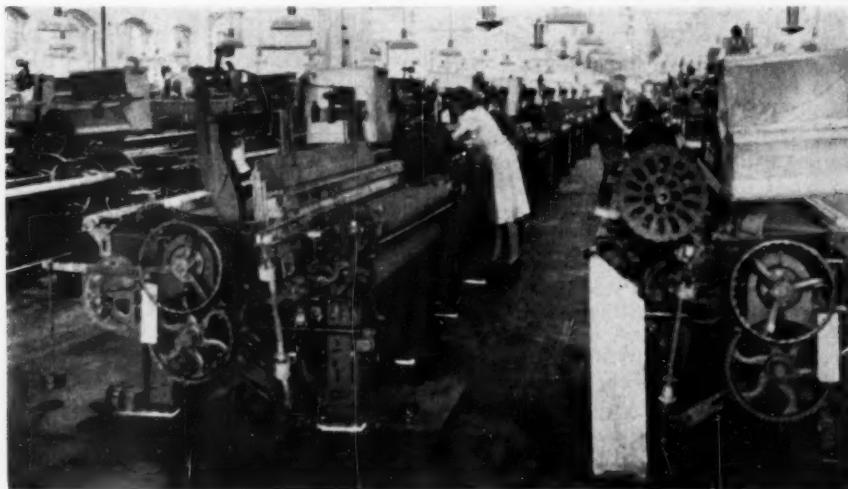
In the field of human engineering, vibration isolation is significantly important for protecting workers' health, builds their morale, and increases their efficiency. Physical discomfiture, which in many plants is directly traceable to nerve wracking vibrations, can rob a plant of its output almost as severely as fire, thievery or other destructive forces whose loss at least can be covered by insurance.

It is said that more than 200,000 looms in use today are mounted on felt footings.

Vibrating floors and high shop noise are common when shock-producing presses, looms, shearing machines, machine tools and other types of machines are bolted down without ample provision for isolating their vibration. Felts have been especially developed to combat and minimize these conditions, and in some cases have effected a reduction in transmitted vibration of as much as 85 per cent. Such anti-vibration felts, made in a variety of grades, are not only unusually effective for isolating vibration and shock, but also are extremely easy to install. Moreover, by eliminating the need for lag bolts these felt pads can save floors and installation time. Machinery mounted on felt pads can easily be relocated by softening the adhesive with solvent fluid, and the felt pads thus removed can be cleaned and re-used.

Why Felt for Vibration Isolation?

Aside from its economy, versatility, ease of application, ready availability





Heavy shears used in cutting sheet steel are set on wool felt pads, using cement instead of lag bolts.

and durability, felt is adaptable to a wide range of applications by selection from assorted types of special and standard material.

Although vibration problems vary greatly in the need for anti-vibration material, the loading of the average production machine usually falls within the range of 10 to 100 psi, which is the range in which wool felt can render excellent service. This is borne out by the fact that research has established that about 80 per cent of all vibration problems met with in industry fall within the medium load range of 10 to 50 psi. Thus, general purpose felt, one of the two primary types of wool felt designed for vibration isolation, which will yield a reduction in transmitted vibrational energy of as high as 85 per cent, can be used for this load range. For loads from 50 to 100 psi, or higher, the second primary type, the denser heavy duty felt, is used. For light loadings, in the range of 10 psi or less, softer felts such as SAE F-6 to SAE F-11 are used.

Long-term tests have shown that felt will not break down under repeated impact loads, that it is resistant to oil

and grease, can be treated to make it resistant to acids, and that it will not deteriorate with age. In addition, it can be made in varying degrees of hardness and thickness and will not fray or ravel when cut. Its remarkable success as an isolator stems from the spring-like and practically indestructible character of the wool fiber of which felt is composed. In short, wool fibers are natural springs and thus vibration isolation, cushioning and padding are among the natural mechanical functions of wool felt.

Selecting and Using Felt for Vibration Isolation

While vibration control theories are rather complicated, the practical solution of the average problem is simple and selecting a felt mount of the right density usually is easy. Selection of the right density for an installation depends primarily on the weight and base area of the machine.

For most installations, a one-half or one-inch thickness of felt is generally effective. However, where extreme vibration or hard impact must be absor-

ed, a one and one-half inch or two-inch thickness is recommended. Felt for anti-vibration purposes is generally supplied by the industry in sheets of various sizes from which small amounts of the required size can be readily cut. While an optimum amount of felt is necessary for proper isolation, a maximum should be avoided. The greatest isolation efficiency is accomplished by using the smallest practical area of felt that resists the load placed upon it without excessive compression.

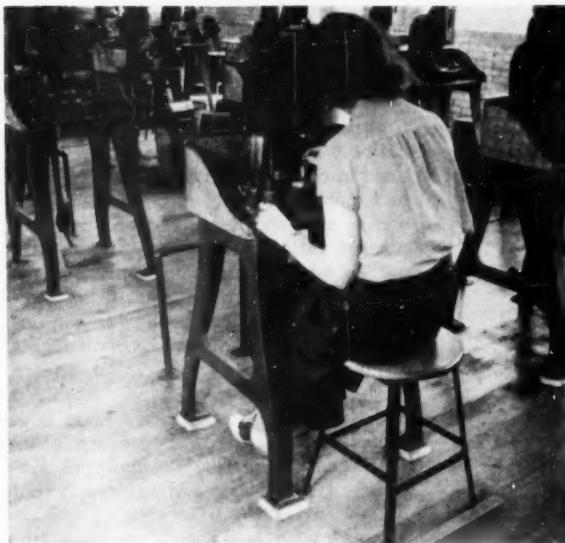
The "smallest practical area" of felt for most machines is roughly equal to the base area of the legs or other supporting members. For flat-bed machines an area approximately 1/20th of the base surface is usually recommended. Once the felt has been cut to size, the felt mounts can be installed as follows:

1. Mark position of the machine on the floor and shim if necessary;
2. Raise machine from floor by block and tackle, or other means;
3. Clean feet or base surface of machine and corresponding floor area;

4. If shims are required, cement them to floor;
5. Apply coating of adhesive, using pressure to force adhesive into pad and also into floor if it has a rough surface. Place pad in position with firm twisting motion to break any skin which may have formed. Repeat for remaining pads. If a double thickness of felt is needed, cement one pad on top of another;
6. Apply coating of adhesive to top surface of mounts. Then lower the machine and allow to set at least 8 hours, preferably overnight.

How to Buy Felt

Most felt companies sell felt suitable for all general vibration problems. They are prepared, as well, to supply felt to specifications to satisfy a particular or unusual problem. If you are not sure whether general or heavy duty purpose felt is suitable for your installation it is recommended that you contact any felt manufacturer and place your problem before him. In so doing, however,



Side thrust caused by pedal operation of this kick press is cushioned by felt mounting pads.

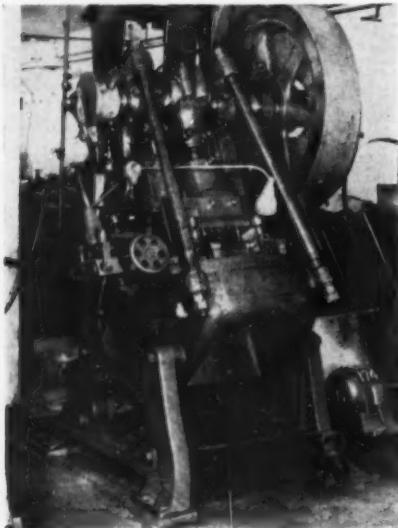
give him sufficient information to work with and include the following data:

1. Type of machine (loom, press, grinder, etc.) with maker's name, model number and serial number;
2. Total weight of machine in pounds, indicating the dimensions, length and width of those parts of the machine in contact with the floor;
3. Indicate whether the machine is driven by built-in motor, individual motor on a separate base, or by belt from line shaft;
4. State composition of floor on which machine is mounted.
5. How are machines identified in correspondence with the manufacturer?

Anti-vibration felt is a relatively inexpensive material, its cost being very small in proportion to the benefits derived from controlled vibration.

Many types of heavy machines, such as presses, shears, drop hammers, etc., are installed upon a concrete block or platform which in turn is supported by

This No. 5 V & O press, at the Berger Mfg. Co., Maspeth, L.I., is mounted on felt.



a felt pad. To renew isolating pads under such machinery would be a tremendous job involving considerable down time and expense. Such expenditures of time and money would be necessary if the pads used for isolation were subject to quick wear or deterioration because of contact with oil or water. As previously stated, neither oil nor water will harm felt and time has little or no effect upon it. Moreover, felt pads can be easily removed. The air-drying or quick-drying cements used to install the pads can be softened by suitable solvents without damaging the felt. Thus machines can be rearranged and remounted on the same pads and the expense of lagging or anchoring machines with screws and bolts is completely eliminated. Even in those cases where machines must be anchored because they are top heavy or because of the need to mount on a sloped or vertical surface, the hold-down bolts can be insulated with felt washers and bushings, which, in combination with felt mounts, effectively reduce vibrations.

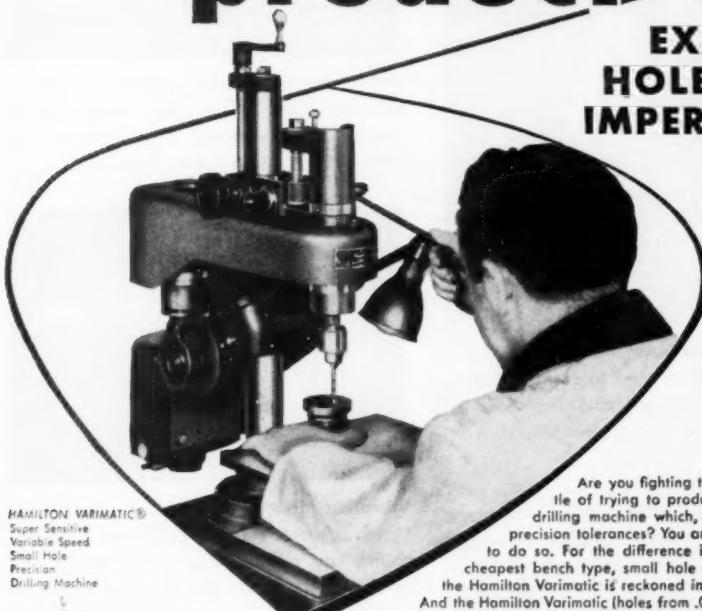
Kinds of Machines Using Felt

The use of felt to isolate machinery vibrations, like the use of felt itself as an industrial, apparel and engineering material, has almost limitless applications. Thus, felt has been successfully used and is being increasingly resorted to for isolating such production equipment as: shoe machinery, printing presses, lathes, punch presses, grinders, milling and heading machines, looms, spinning frames, drills, marine propulsion diesel engines, hosiery machines, air compressors, die casting machines, forging hammers, pebble mills, shears, washing machines, sewing machines, electric motors, pumps, riveting machines, stokers, forming presses, office equipment such as graphotype machines, typewriters, addressograph machines, and many others.

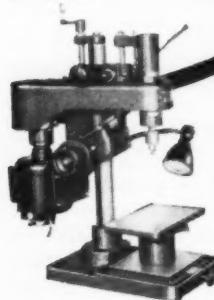
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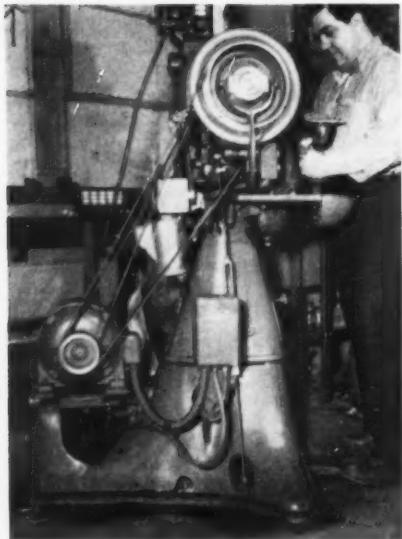


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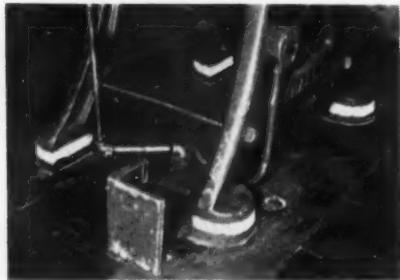


Goodyear outsole and lockstitch Model 0 with felt pads cemented to feet and floor. No bolts or lag screws used. Pads absorb from 60 to 85% of transmitted machine vibrations.

isolation of inclinable presses—a large Maspeth, New York, machine company decided to try felt in a test run. A number of inclinable presses of different sizes were chosen for the test. The feet of the presses were cemented to felt pads, which in turn were cemented to the floor. After six months of working at top speed, on practically a 24-hour-per-day schedule, the presses were anchored as firmly as ever, even without the use of bolts or lag screws. Subsequently, this company mounted all of its presses on felt effecting a 75 per cent savings in time and labor spent in installing and repositioning machinery. Moreover, the pads, which absorb from 60 to 85 per cent of transmitted vibration and noise, effect additional savings through reduced maintenance and by



Felt is one of the least expensive ways of isolating vibration. Readily available adhesives make excellent bond between any floor, felt, and machine member.



Vibration due to the impact strokes of punch presses, clickers and other light machines are successfully cushioned by felt pads placed under the feet and cemented to the floor.

reducing wear and tear on machinery and buildings.

Certain types of installations, such as big marine diesel propulsion engines, require more positive mounting than the average industrial machine. But even here it has been found possible to eliminate the use of lag bolts and other anchoring means. In this type of installation, the felt isolators contain the correct type of material for the heavy loading encountered. Furthermore, cushioning of the thrust of the screw both ahead and in reverse is accom-

SHORT RUNS OF PRECISION

G G E A R S

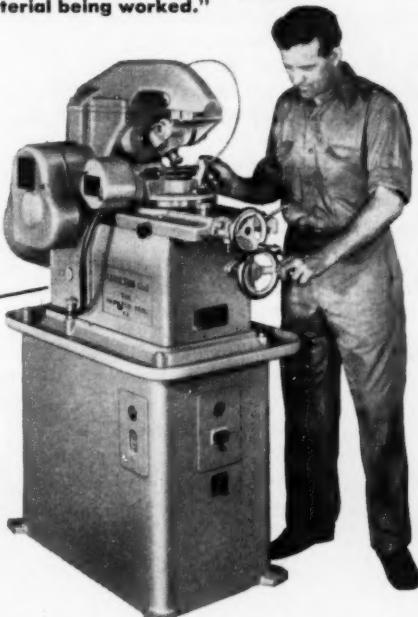
Short runs of small, fine pitch, precision gears (gears up to 6" O.D. of the gear blank) carry high unit costs largely because of the top-heavy machine set-up time as compared to total production time. You can beat the machine set-up problem by routing small precision gear jobs to Hamilton Precision Gear Hobbers ... for:

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plished by felt units, without the necessity of an auxiliary thrust bearing.

In the textile industry, which is characterized by the use of a large number of vibrating machines, thousands of looms used to weave cotton, woolen and worsted goods, synthetic fabrics and even carpets are mounted on felt pads. Other textile equipment so mounted includes openers, spinning frames, twisters, slashers, sizing machines, sewing and knitting machines, etc. However, the most significant application of felt for isolation in this field is in looms.

Loom operations are accompanied by the rapid acceleration and stopping of many parts in at least three directions, producing sharp beats which hammer the mechanism severely and combine to cause the well-known clatter of the weave room. Felt pads under the feet of the looms not only ease their operation by isolating and giving each machine a certain freedom to work on its own foundation, but materially reduce floor vibrations, wall vibrations and airborne noise.

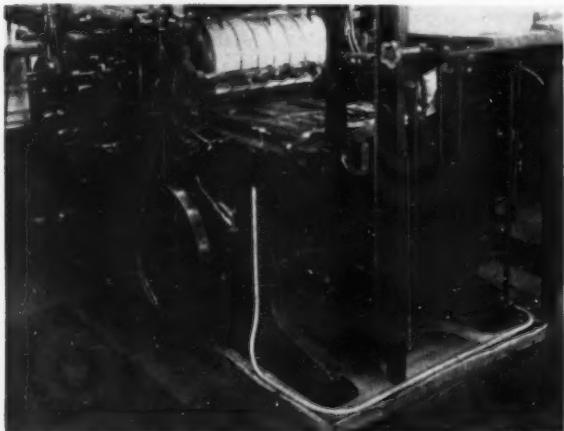
How Effective is Felt?

Some felts will withstand maximum loading of as much as 35,000 psi and will absorb frequencies as low as 2400 cpm,

indicating that this anti-vibration material has a wide range of effectiveness. But even felt manufacturers themselves are constantly seeking new information on how this material can be used in new applications.

Not so long ago, one of the leading felt manufacturers had some independent consulting physicists make a purely objective study to determine what could be expected of resilient felt mountings used under textile machinery. For purposes of this study a Norton-Young seismograph was used to measure the vibrations transmitted to a cement floor by two types of automatic looms (1) an automatic Cotton King Dobby and (2) a Dobby Supersilk Shuttle Changer, both mounted and not mounted on felt pads.

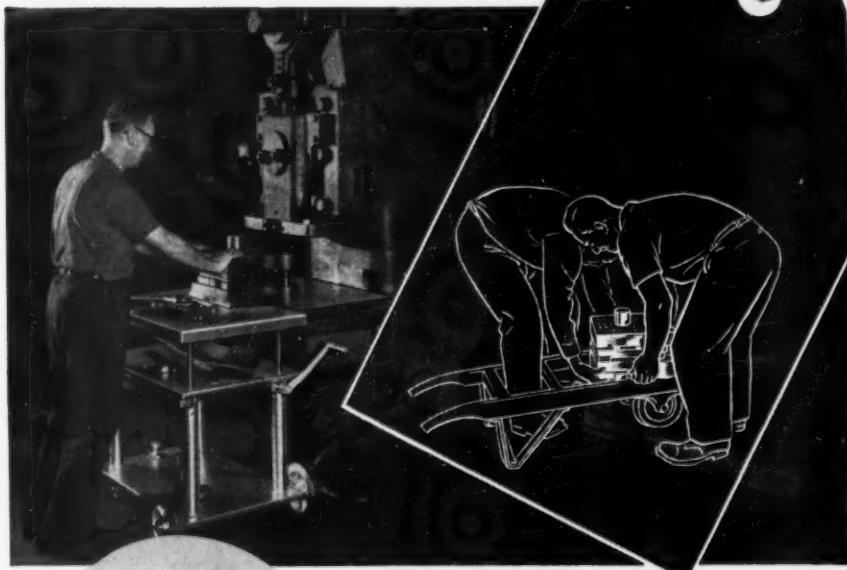
Measuring the vertical vibration at each leg of the cotton loom showed that when the machine operates at 176 rpm the greatest reduction of vibration, when felt pads are used, takes place at the front legs, which experience the greatest vibration to begin with. The record also showed that there is comparatively little vibration when the machine operates at 139 rpm, which indicates that indiscriminate use of felt



Pads of wool felt interposed between the feet of this Simplex press and the foundation render its operation more quiet.

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pads serves no particular purpose at this level of operation. At the higher speed, however, the felt pads, according to instrument readings, effected the following reductions in vibration: 65 per cent for front leg No. 1, 85 per cent for front leg No. 2, 60 per cent for rear leg No. 3, and a negligible reduction in vibration for rear leg No. 4. Actually, leg No. 4 is not subject to appreciable vibration at all, and although the felt pad theoretically could be omitted, for practical purposes it is necessary for proper leveling.

In the case of the silk loom, when this machine operates at 139 rpm, front legs No. 1 and 2 experience the greatest vibration, which can be cut by 60 per cent through the use of felt pads. The rear legs experience very little vibration with or without felt pads, according to seismograph readings. The sum result, as is evident, shows a wide difference, vibration-wise, between both machines. At 139 rpm the use of pads under the

cotton machine would make no appreciable difference, which is another way of saying that each kind and type of machine presents its own problem in vibration isolation and should be so considered to avoid disappointing results.

In another test of the efficiency and economy of felt mountings, 100 W-2 Crompton and Knowles looms were mounted on felt pads and maintenance costs compared over a four-month period with 80 looms not so mounted. On this basis, the savings in maintenance per loom per year amount to \$15.48. The felt pads cost \$8.20 per loom. Thus, in this instance, the pads paid for themselves in about seven months, with, for all practical purposes, an indestructible life still ahead for them.

The End.

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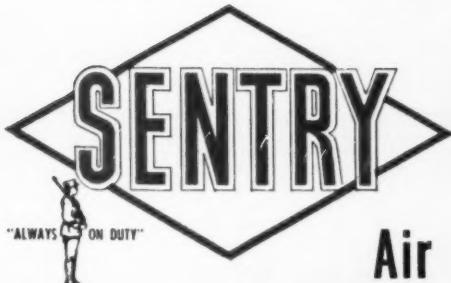
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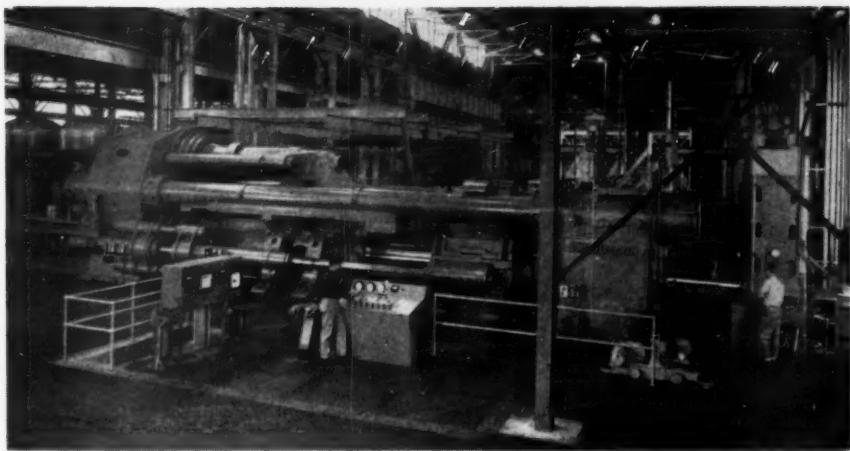
Big Squeeze . . . 14,000 Ton Extrusion Press in Operation

THE NEW 14,000 ton extrusion press at Alcoa's Lafayette, Ind. works will form four times the weight of aluminum previously possible in one "squeeze." Auxiliary equipment for the 14,000 ton press is a massive, 180-foot long stretcher which will straighten extrusions as long as 110 feet. This is the world's largest machine for stretching extrusions and can straighten 67S aluminum alloy shapes up to 60 square inches in cross sectional area.

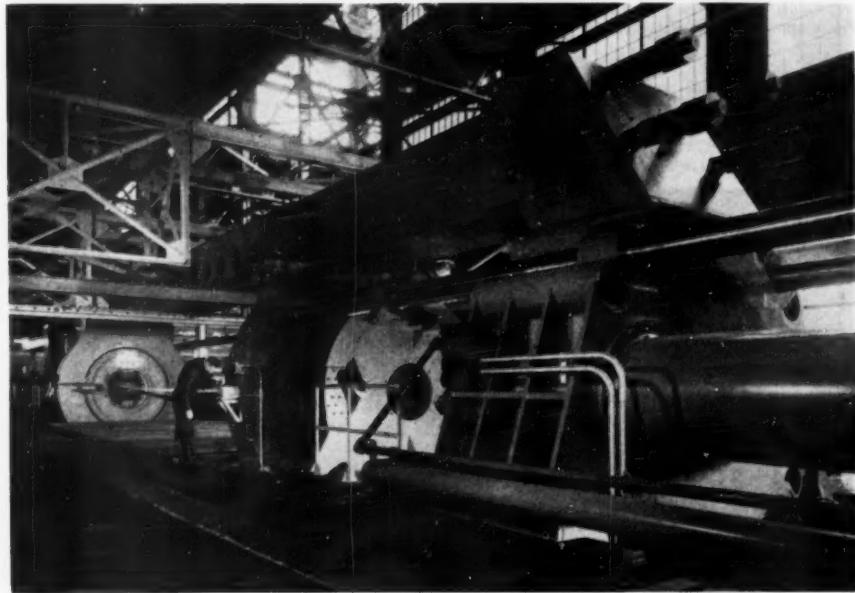
Press and stretcher will team up to produce aircraft structural parts for such planes as the Boeing B-52 jet bomber. Large extruded shapes will some day be available for railroad, car, bus, ship, truck and trailer construction. Pipe up to 2-in. in diameter can be extruded on the press.

Alcoa can now offer extrusions weighing as much as 2500 lbs. and measuring as long as 110 ft. per piece. The size that can be produced in that length has increased with the operation of the 14,000-ton press from 5.4 lbs. per foot to 22.7 lbs. per foot, or from 4.5 sq. in. in cross-sectional area to 19 sq. in. The practical maximum circumscribing circle diameter for shapes has increased from the present 13 in. to 23 in. Because of the high unit pressures that the big press can exert on strong aluminum alloys, Alcoa can offer extruded shapes that are not only larger and longer but also thinner than previously possible. This results in a highly desirable combination of light weight and high strength.

The three million pound stretcher shown at right is used to "pull" extrusions produced on the extrusion press. The 180 ft. long giant stretcher has a combined pull of 38 Diesel locomotives.



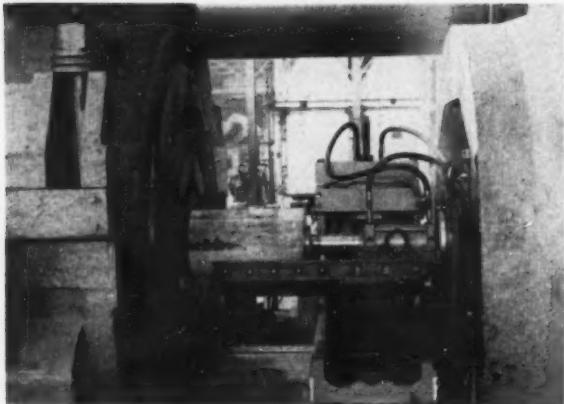
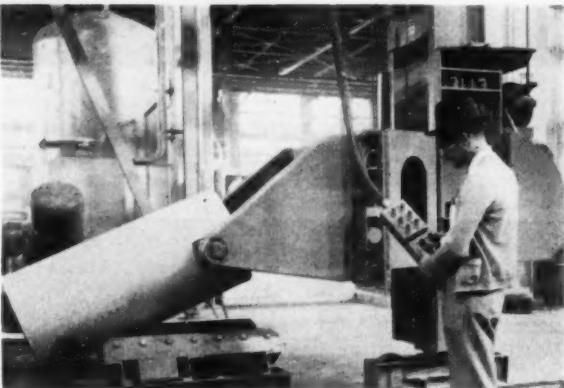
Over-all view of world's largest extrusion press. This 14,000 ton unit is the first of the giant presses ordered under the U. S. Air Force Heavy Press Program to begin production.



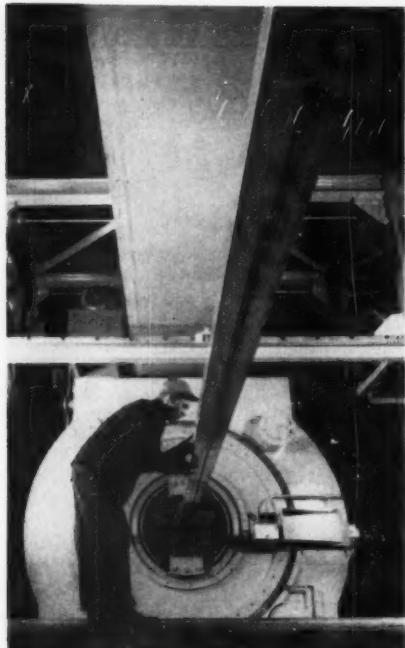


The big extrusion cylinders shown are the metal container assemblies for the press. These big assemblies, which weigh as much as 57 tons each, are used to hold the extrusion ingot. The press ram then pushes through the assembly and extrudes the metal through the die at the other end. A different assembly is required for each different diameter of extrusion ingot.

"Stak-Rak" handling device is delivering a heated ingot to the press. From this point the ingot is automatically fed into the press.



Hydraulic unit is delivering ingot into the extrusion cylinder of the press.



An extrusion is being stretched in the 3 million pound stretcher.

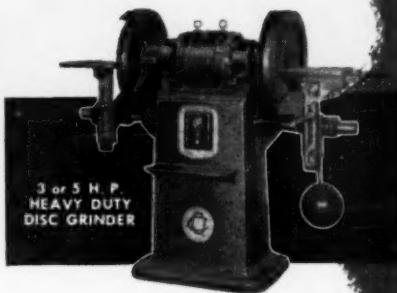
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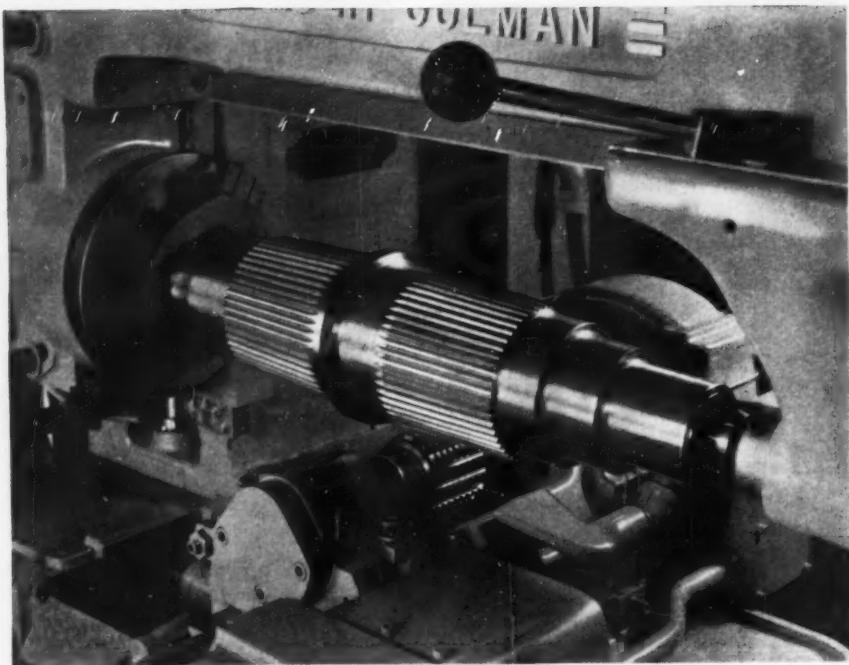
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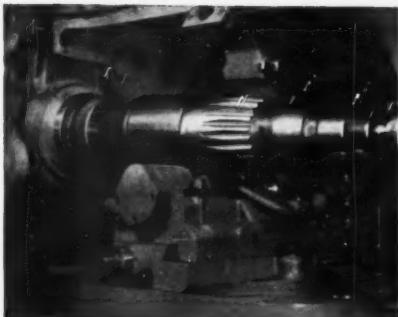
work slide and overarm swivel up to 5°

This Barber-Colman No. 16-16 Hobbing Machine is specially designed and arranged for hobbing tapered serrations. By swivelling the work slide up to 5° to obtain the desired cutting angle, several different tapers may be hobbed on the same machine. Once the proper set-up has been made, hobbing of tapered serrations proceeds according to standard hobbing technique.

Other than the special swivel arrangement on the work slide, universal joint on the worm shaft, and a cut-away outboard overarm support, this machine is of standard design and illustrates the practicability of adapting special work to standard hobbing techniques.

When not in use hobbing tapered serrations, this machine can be used for standard spur or helical gear work and straight splines. It is equipped with an Automatic Hob Shifter for maximum hob life.

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metal-to-metal fit, wear compensation

Tapered serrations provide one of the best holding means for drives which have heavy and frequently-reversing torsional loads. The metal-to-metal side bearing fit eliminates relative rotation between members, and the taper provides for take-up to compensate for wear. Typical applications are heavy reversible drives such as tractor axles and hubs, and high-frequency reversible drives such as steering shafts and Pitman arms.

involute tapered serrations

Both involute and straight-sided tapered serrations may be produced by this hobbing method. The major illustration shows the hobbing of 10/20 diametral pitch involute serrations, $\frac{3}{4}$ " taper per foot O.D., 54 teeth, and 6" major diameter. These teeth have a generated form with tapered root and outside diameter, the form changing continuously from the large to the small end. The mating part is swaged slightly undersize and the desired contact is obtained as a result of cold working the material in fitting the members. The swage is usually hobbed by the same set-up as the tapered shaft.



straight-sided tapered serrations

The second illustration shows the hobbing of straight-sided serrations using a single-position hob. These teeth are hobbed in 2-cuts and have straight sides with constant-width tooth spaces which permits the mating part to be broached to size after reaming to the correct taper. The internal mating part is broached one tooth at a time, providing a metal-to-metal fit which is not dependent upon cold working the material. Should looseness occur due to wear, it is taken-up on the tapered sides of the teeth.

Barber-Colman Engineers developed the special single-position hob for producing tapered serrations with a constant space width. They welcome special applications where this type of drive is an advantage and will be glad to furnish estimates on both hobs and machines for economically producing tapered serrations. Just send prints or samples marked for the attention of our Hob Engineers.

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H O B S A N D M A C H I N E S S I N C E 1911

Time Study . . . part 1

Selecting the Operator To Be Studied

By **Harold R. Nissley**, Professional Engineer
Cleveland, Ohio

THE SELECTION of the operator to be studied is important from management's, the union's, the operator's, and the time study man's points of view.

Management's Interest in the Correct Operator

Management knows that a slow or inexperienced operator, or a fast but "cagey" operator, is likely to introduce variables in the final results that will make their position on a fair day's work difficult to sustain. To be sure, the rating or levelling factor of the time study engineer is supposed to offset the higher times resulting from less than normal speeds. But management has been through this rating hassle enough times to know that the greater the deviation of an operator (especially below nor-

mal), the harder it will be to sell the standard. Frequently, the final standard is settled in a grievance meeting and lies somewhere between normal and below-normal performance. Were it not for the possible charge of "speed up" management would insist upon timing the fastest operator; if any compromise had to be made, the final figure would lie closer to the true fair-day's-work figure.

The Union's View on the Correct Operator to be Studied

The union, of course, is not interested in selecting fast operators to be time studied. They know the performance of such operators will be used as a lever against them and the rest of the shop—"If John Smith can turn these out at the

Note: This is the first part of a new series of time study articles written by Mr. Nissley. A previous article, "How to Make Your Time Study Standards More Accurate . . . More Scalable," appeared in the March, 1954, issue. Succeeding articles in this series will discuss: "Making the Time Study and Rating," "Summarizing and Analyzing the Data," "Setting and Selling the Standard."

rate of 100 an hour, surely the others doing the same work can match his performance." Where there are several operators doing the same task, therefore, the union becomes suspicious when the fastest operator in the group is selected to be time studied for standards purposes—despite the fact that the rating of the time study engineer adjusts (increases) the observed time values to bring these fast observed times into line with that of a normal operator. But because of this common lack of understanding about rating the union is no more anxious to see its fast operators timed than is management to see its slow or "cagey" operators timed.

The Operator's Attitude

There is no one attitude that expresses the operator's attitude in this matter. The attitudes of operators will vary with background, union experience, and personality traits.

An older and perhaps slower operator will resent the timing of a younger and faster operator. The old timer feels—and with some justification—that the younger person's pace will ultimately become his pace which he may find difficult to match. If the older operator is suffering from nervous frustration, this feeling of suspicion and resentment is all the keener; indeed, it may even reach the point where the operator will not even trust his own union officers in their appraisal of such matters.

Young, inexperienced operators may resent the timing of smooth, fast oper-



ators who might be older. They may argue that these other operators do not observe all of the quality standards, or use methods not approved by management, or have better, sharper tools.

The Time Study Observer's Selection of an Operator

Were it not for many of the foregoing factors, the typical time study man would prefer to time study the fastest operator even though he would allow more time in his time standard by applying a liberal rating factor to his observed times. There are several rea-



Harold R. Nissley received his Ph.B. from the University of Chicago in 1925. Since then he's taught at Kent State University, Miami University and Texas Technological College. For eight years he was Industrial Engineering Consultant to G-E at Nela Park, Cleveland, Ohio. He was sole arbiter on production standards dispute, Am. Steel & Wire Co. vs. United Steelworkers of America (CIO); sole arbiter, jurisdictional and disciplinary disputes, United Steelworkers of America vs. Electro Metallurgical Co. In 1952 he was on the arbitration panel, Federal Mediation and Conciliation Service. Since 1951 he has been a consulting engineer in Cleveland, Ohio.

sions for this. The fastest operator usually has better motion patterns than the slower operators; he may have incorporated some short-cut job design features in his job which the others do not have. For whatever reasons, the fastest operator has demonstrated his ability to turn out work in a hurry, reasons which are of interest to the time study observer. Furthermore, the time study observer knows that a standard of 100 units an hour is easier to sell if it is based on a study of a fast operator who can turn out 120 units an hour compared with a study based on an operator who can only turn out 80 units an hour.

However, union and operator objections to time study observations based solely on the fastest operator are so great that most experienced time study men will not limit their observations to such fast operators. They will, instead, study either an "average" operator or one fast operator and one slow operator.

The Writer's Approach to the Operator to be Time Studied

Because of the job design, psychological, and other factors involved in the selection of an operator to be time studied, the writer prefers to meet most of the objections raised above even though it takes more time to arrive at an acceptable standard. The amount of time and the number of studies will depend on a number of variables: the condition of the industrial relations existing in the plant, the number of variables in the job design (e.g. heat, coolants used, condition of cutting edges, voltage, finish, etc.).

Case I: What Operator Should be Selected for Demonstrating the Fairness of a Work Standard that is in Dispute?

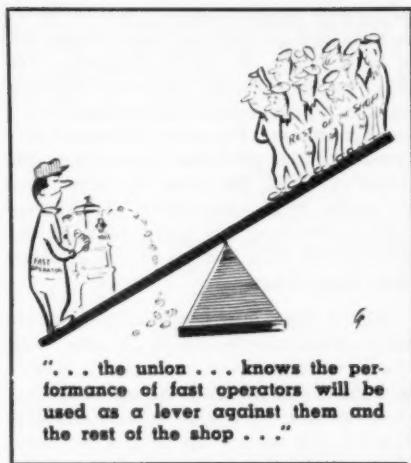
Several months ago I was called in by a works manager to help settle a dispute arising from a work standard



dispute. I was told the union president would have to be sold on the company standard, if it was found to be reasonable. The union president lived up to the works manager's description of him: he was both talkative and argumentative. Evaluating the scope of the problem, I realized that I needed help in solving it.

My approach was simple and straightforward. In the presence of the union president I told the works manager that I would like to time study three operators selected jointly by the union president and the foreman in the department. I turned to the president and said that the joint selection of these three operators by himself and the foreman did not necessarily mean that I must abide by the results of their "normal" operator performance. But, I explained, such a union-company understanding at the beginning might minimize arguments later when the time study results were worked up.

The union president saw no objection to this if he and the foreman could



agree on three operators out of a pool of 18.

Three such operators were selected by the president and the foreman. I was a little surprised at one of the selections of the president: both the foreman and I thought this one operator was above normal. (In my time study I gave this operator a rating of 110 per cent—despite the president's conviction that the operator was "just average.")

Because the union president was with me during my time study observations and because he had a hand in the selection of the operators to be studied the final results of this one day of time study observations and write-up were not difficult to sell.

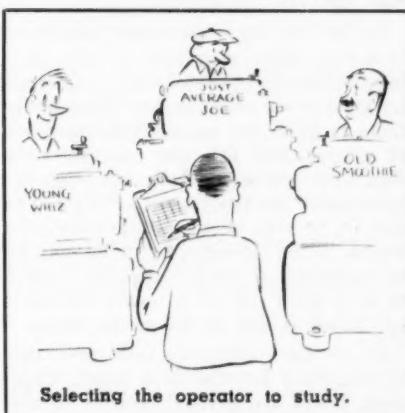
Case II: Machine Speed Versus Operator Speed.

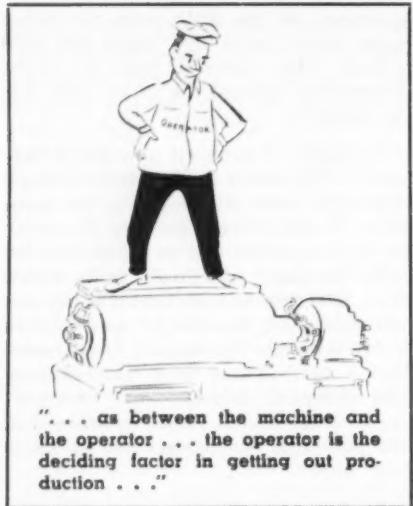
A few years ago I was doing some time study work in an airplane factory where nearly a score of operators were using hand drills in fabricating parts of a wing section. Production figures varied considerably; the fastest operator was drilling over twice as many holes in an hour's time as the slowest

operator. All the drills were the same: same make, same size, same size drill points. The material was the same. Everything seemed the same. Why this difference?

I thought I detected a slight difference in the sound of each drill although the drills were all bought at the same time. A tachometer test on the drills at the end of the day revealed that the speed in these "identical" drills varied from 1900 rpm to 4500. This was the nub of the problem, thought I. I spent part of a day with the Purchasing Department trying to find out why the company had accepted delivery on "identical" drills whose speeds varied by more than 100 per cent. No one seemed to know just why.

I returned to the department to find out if the slowest drills were being used by the slowest operators. Much to my amazement the fastest operator in the department was using the slowest drill! After observing this operator I discovered that instead of letting the weight of the drill carry the drill point through the aluminum, he practically pushed the point through; and the slower operators using the fast drills





in some instances used little or no arm pressure on their drills.

Although I am a firm believer in giving a workman good tools to do a job, this experience bolstered my conviction that as between the machine and the operator, the operator is the deciding factor in getting out production.

What Happens When There is Only One Operator to Study?

So far we have discussed situations in which there is a pool of operators from which an operator can be selected for time study observations. Frequently there is only one operator doing a job at a time. And this one operator may be a new operator who is not even familiar with the equipment he is going to use. Or he may be an old operator who is slow in his movements. Or he may be an experienced normal operator trying to do a good job on a newly designed job which is still in the setup stages.

All of these situations pose problems of judgment for the time study engineer. There are several courses of ac-

tion open in each case: (1) Refuse to set a standard on the job until things jell a bit firmer; (2) set a temporary (30 day) standard on the job; a modification of this practice which the writer favors is the setting of a work standard followed by the probable tolerance limits—for example, 100 units an hour (plus or minus 20 or even 50%); (3) synthesize a standard by using data in the time study files instead of the production floor figures.

All of these makeshift arrangements have their shortcomings. If the time study engineer refuses to set a standard until the job and the operator become steadier, the supervisor complains that he will not get any production from the operator until a rate is put on the job. Temporary standards have a habit of becoming permanent standards unless very carefully watched; moreover, operators have been known to hold back on production when on a temporary rate until a permanent standard has been set, thus management may lose a good part of 30 days of production.

The synthetic approach to a new standard problem is least objectionable of all because a standard built on standard or tabular data minimizes the rating

The analyst and the operator or the foreman squeeze the water out of the job.

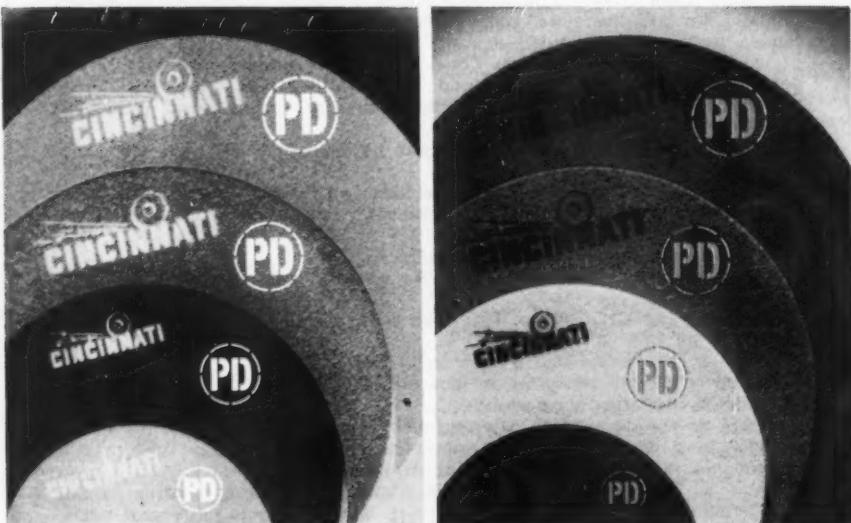


What Do You Want to Know About Time Study and Incentives?

In April of this year BLUE BOOK'S Editorial Board met with Mr. Nissley and "spelled out" for him the kind of questions the readers of the BLUE BOOK would like to have answered in a series of time study articles. It will, of course, be impossible to cover all of these questions in four short articles—unless Mr. Nissley devoted his entire energies to a series of question-and-answer articles. We will, therefore, concentrate on those questions which you, the reader, are particularly interested in. You may check the ones below, suggested by our Board, which **you** would like to have answered and return this page to the Editor of MACHINE and TOOL BLUE BOOK, Wheaton, Illinois. Mr. Nissley will answer as many of these questions as time and space will permit.

1. Is there any incentive system that can be applied to job shop operation? _____
2. What are the supervisor's responsibilities for sound incentives? _____
3. Is there any incentive for a supervisor to administer an incentive plan? _____
4. What is the best method for levelling? _____
5. What assurance do you have that the operator will perform the job as it is studied? _____
6. How do you balance the line when several units or models are going down the line at one time? _____
7. How do you keep time studies up-to-date? _____
8. When is the job ready to be time studied? _____
9. What is a normal operator? _____
10. What do you do with the older marginal operator who becomes the bottleneck in a production line or group incentive pool? _____
11. How do you handle scrap or shrinkage? _____
12. How do you show the benefits of a sound standards program to the operators and the union? _____ How do you indicate to the operator that he has contributed a fair day's work for a fair day's pay? _____ How do you prove that time study will equalize the work load distribution for everyone? _____
13. How do incentive systems stand up in courts of arbitration? _____
14. What are the advantages and disadvantages of an incentive system to an employer? _____
15. What are the pitfalls of an incentive system? _____
16. What happens when short-run jobs come back in long runs? _____
17. What is the maximum methods change that can be allowed before a job can be re-timed? _____
18. How can you tell when an operator is trying to fool the time study man? _____
19. What are proper allowances? _____
20. What are the "legal" methods changes that will permit a rate to be changed? _____
21. How much and what kind of training is needed by foremen to administer an incentive and time study program within their respective departments? _____
22. What is the best background for time study engineering talent—above average shop hands, college graduates, supervisory talent? _____
23. What provision do you make for new operators or learners to make the rate? _____
24. What are the merits of individual and group incentive? _____ Which one do you consider better? _____
25. What are the proper fatigue allowances? _____
26. How do you handle unavoidable delay allowances? _____

Greatest Grinding Wheel Development in Years



NOW!
Cincinnati Grinding Wheels offer
POSITIVE
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Without a doubt the new CINCINNATI (PD) Manufacturing Process is the most important grinding wheel development in years. It is an achievement in precision manufacturing and quality control that will save you money and increase your production. Here's why:

Through the CINCINNATI (PD) Manufacturing Process, you can be positive that every CINCINNATI (PD) Wheel you order will be produced exactly to the Cincinnati grading specified for your job.

Just as a negative guarantees exact duplication of a photograph, the CINCINNATI (PD) Manufacturing Process assures a **POSITIVE DUPLICATION** of the original wheel **EVERY** time you reorder.

The problem of duplication has been a major concern of Cincinnati Milling throughout its 30 years of experience in using grinding wheels, and in supplying industry with precision grinding machines equipped with grinding wheels and ready for production operation. Cincinnati Mill-

ing found that once the right wheel had been specified for a job, it was frequently difficult to secure additional wheels of identical grading that would duplicate the performance of the first wheel. The need for positive duplication is of utmost importance not only to Cincinnati Milling, but to every user of grinding wheels.

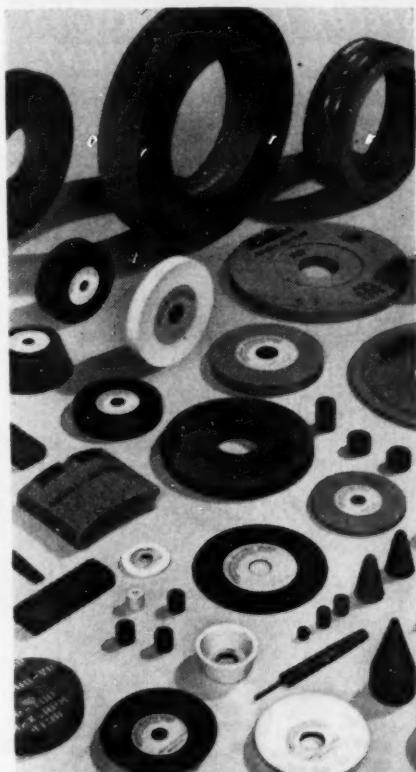
Positive Duplication (PD) is the result of extensive manufacturing research which revealed that *several steps* in the production of grinding wheels generally considered as unimportant, were, quite to the contrary, *extremely important*.

As one step toward (PD) wheels, Cincinnati Milling constructed the world's most modern grinding wheel plant. Some of the equipment installed has never before been used by the industry in the manufacture of grinding wheels.

Then, to make (PD) wheels an actuality, Cincinnati Milling developed new standards of manufacture with 36 quality control steps. From the weighing of the grain and bonding material, through molding, drying, firing, finishing, to final inspection, every operation is carried out with the same exactness as in building a precision machine tool.

You're assured a **POSITIVE DUPLICATION** of the original wheel **EVERY** time you reorder. "On grade" with a CINCINNATI (PD) Wheel means all future (PD) wheels will act and grind exactly alike. For you, this means *no more* production interruptions which cut output and increase your costs.

Let us prove to you how CINCINNATI (PD) Wheels will make money for you. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire, or 'phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

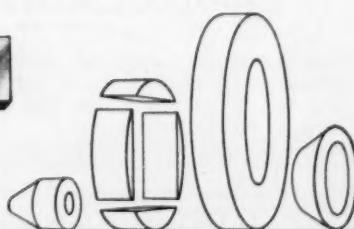


CINCINNATI (PD) Precision and Snagging Wheels are available in vitrified and resinoid bonds in a complete variety of sizes and shapes.

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Grinding Wheels

THE CINCINNATI MILLING MACHINE CO.
Cincinnati 9, Ohio

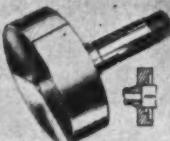


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problem and, if done carefully, incorporates some of the final job design thinking which the operator or the company will finally incorporate in the job. On the other hand, the synthetic approach may result in what seems like a tight standard at first because the analyst will frequently squeeze out the "water" at the beginning—the same water which either the operator or the foreman squeezes out of the job frequently after it is put on standard.

Like other aspects of rate setting, no hard, fast rule can be given to cover a given situation because of the many variables that go into different job situations. Good engineering judgment frequently must give way to immediate production quotas. But the astute time study engineer will surround his production standards with sufficient information so that all who read his time study summary sheet will know what the limitations as well as the possibilities are of his time study.

End of Part 1.



"If production planning would schedule
the right parts we wouldn't have to
substitute."

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for you...**

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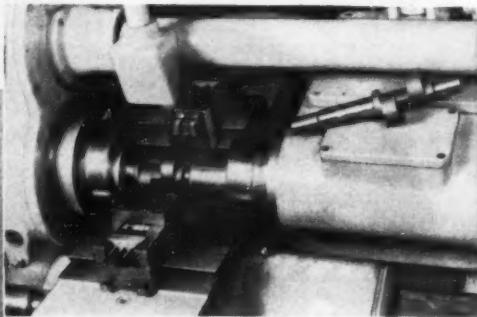
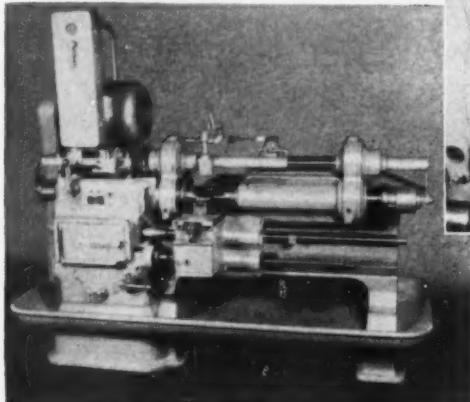
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MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

Model LR Lo-swing Automatic Lathe equipped with double-end drive for machining eccentrics.

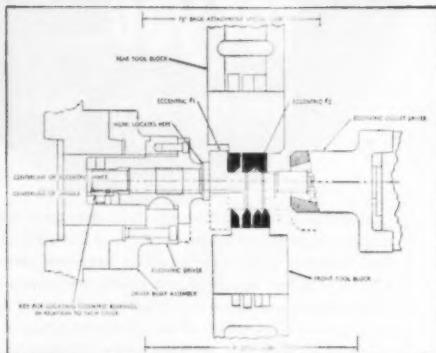


DOUBLE END DRIVE Lo-swing LATHE MACHINES ECCENTRICS AT A FAST PACE

PROBLEM: To accurately machine eccentric bearings on compressor shafts within close tolerances.

SOLUTION: The Model LR Automatic Lo-swing Lathe selected for this operation was equipped with a double-end drive to prevent twisting or distortion of the shaft due to tool cutting pressures. The drive to the tailstock is taken from the headstock spindle and transmitted to the tailstock spindle by means of an overhead drive shaft. Special gearing eliminates all backlash.

The work is held and driven with offset drivers mounted on both the headstock and tailstock spindle noses as shown in the line drawing. The drive from the headstock end is through a key which positions the



shaft in relation to either No. 1 or No. 2 eccentric. The drive from the tailstock spindle is by means of an air-operated collet driver. Loading and unloading of parts is facilitated by an air-operated tailstock which retracts 6-1/2" by a simple movement of an air control valve.

The tooling used for this job is shown on both the line drawing and the close-up view of the operating area of the machine. The front tool block has four tools for turning the eccentric and the clearance diameters adjacent to the eccentric. The back squaring attachment carries three tools, one for facing the side of No. 1 eccentric and the other two for chamfering the edges of No. 2 eccentric.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH *Lo-swing*

Selection and Care of Ball and Roller Bearings

By W. C. Betz

IN ALMOST any mechanism having revolving parts ball or roller bearings can be used to advantage in saving of power, repairs, and lubrication.

For very cheap mechanisms the unground type of bearings may be purchased at a cost a little higher than a plain bearing installation. As the degree of accuracy requirement increases the finer finished bearings will be required.

Starting from the heavy installations we will take the case of the railroad bearings which are almost exclusively of the roller type. These bearings are fast replacing the old box type plain bearings and it will only be a short time when all new rolling stock of railroads will be equipped with roller bearings exclusively. Their use eliminates expensive inspections at terminals, cuts out ninety per cent of lubrication cost and cuts friction to less than five per cent.

The question arises, what type is best and least troublesome in service?

For simplicity, the taper roller type seems to be the better for general service due to the fact that it can take thrust as well as radial load.

The straight roller types are very efficient but require, in addition to radial capacity, some device to take thrust loads. These are either plain disks or special ball type installations. This type generally costs more to manufacture and to buy than the taper roller boxes.

On some of the European railroads ball bearings are used with good success. Balls of very large diameter are used and bearings of the radial thrust type find most favor. In this country roller bearings are used almost exclusively.

Electric motors and generators are another beneficiary through the use of ball and roller bearings. Through them the hazard of fouling between the stator and rotor windings is practically eliminated as against plain bearings which, when they wear, can raise havoc

through contact of windings, to say nothing of lubrication worries and care. The slight extra cost is more than compensated for in motor life.

In machine tools too, ball and roller bearings are being used more and more due to their longer life and cost free operation. In the gearing mechanisms of machine tools ball bearings find most favor, while for spindles on heavy duty machines, such as for milling and turning, roller bearings work out better as a rule, while for high speed grinding spindles ball bearings are a must. On sensitive instruments, such as Ford, Sperry, Union Switch and others of this type, super precision ball bearings are used exclusively.

Where end play must be eliminated the taper roller bearing or the use of a radial thrust ball bearing should be used. In grinding wheel spindles where speeds do not exceed five thousand r.p.m. plain straight roller bearings with ball thrusts to take up end play give excellent service. In this type of bearing a certain amount of takeup is possible between the outer and inner rings by having a taper bore on the inner which is backed up by a threaded collar on the spindle that exerts pressure on the inner ring. It may be expanded by a small amount to make up for wear between the rollers and inner and outer ring; this amount will be between .0001" and .0003" and will extend the life of the bearings considerably.

For spindles running over five thousand r.p.m. super precision radial thrust ball bearings must be used. They should be mounted in tandem with all thrust at the front end, the rear pair of bearings to be allowed end play in either the housing or on the spindle to eliminate expansion and resulting overheating. Both sets of bearings should be preloaded. In connection with high speed applications oiling should be done with a mist spray, or light oil with slow

circulation, or the bearing may be packed with a light grease which is sealed in.

Oils used should be free of acid to prevent rust formation on the balls and in the races. In using greases, they should not contain plumbago, mica, sulphur or any other solid that might pack in the races which will ruin the bearings. We have had bearings returned to us where the outer rings were cut in two due to the use of such materials packing between races and balls.

Where heavy intermittent cuts on lathes and milling machines are taken the taper roller bearings are more adaptable, although lathe spindles equipped with suitable ball bearings have been found very satisfactory. A case in point is a heavy twenty inch geared head lathe which we equipped with two No. M217W bearings on the front end of the spindle and two No. 212W1 on the rear. The front bearings were preloaded to 1000 pounds and the rear to 800 pounds. These bearings ran five years and two months before we took the machine apart to examine them. We found on checking preload that the front bearing read close to 850 lbs. and the rear about 700 lbs. As we found the bearings in A-1 shape we preloaded the front to 1200 lbs. and the rear to 1000 lbs. and ran the machine another four years and six months, when our chief engineer wanted to take the bearings out to be used as examples for advertising. We put in a new set of bearings of the same sizes and type which have been in the machine since October 1943 and are still going strong.

This machine is used on heavy work, sometimes on two shifts daily, and uses carbide tools with heavy feeds on 5210 steel.

As we do most of our own form tool grinding we equipped our No. 13 Brown and Sharpe toolgrinders with No. MM 205 WIX super precision bearings with



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odors—even in the hottest weather. And CIMCOOL, in contrast with old-fashioned cutting fluids, can be kept at work longer. Thus, CIMCOOL greatly reduces downtime and labor costs for cleaning and changing.

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an eighty pound preload. These bearings last about a year under constant use.

For internal production and on tool room spindles we use only preloaded super precision bearings of various sizes according to spindle diameters and speed requirements.

Bearings should be kept clean, as a very small particle of dirt can ruin a bearing. It is best to keep bearings in their wraps until they are to be installed. Maker's instructions should be rigidly followed to get the best results from them.

The End.

Kit Your Production Tooling for More Efficiency

By Harold D. Rhodenbaugh

IT IS NOT UNUSUAL to see highly paid and skilled machinists lining up at tool crib windows in many of our industrial plants. Here they stand and wait for setup tooling or gages to be selected and checked out to them.

In a job shop this may be tolerable even though expensive. In a production shop it is prohibitive because of cost and because of production schedules that are to be met. If two hundred men each lose five minutes a day waiting for tools, the company, at the end of five days, has paid for 205.3 productive hours for which it receives nothing.

There is an approach to this problem that has proved to be practical and economical. It gets the right tools to the right machine at the right time and it is done through a kit system.

Many companies buy and kit tools, jigs, fixtures and gages for each individual operation. This is an answer to the kit-

ting problem, but it is not altogether an economical one since vast sums of money are tied up in tooling . . . standard tooling that may lie idle in a kit for months, or even years at a time.

To overcome the great expense of this usual operation, and by making a few minor changes in shop procedure, it is easy to set up a practical system that will function properly right down to a job-shop operation without investing many dollars in duplicate tooling.

Following is a step-by-step procedure to a sound, practical kit system which the writer introduced. It is in operation in a plant of 1900 employees:

1. Select one man who knows tooling and is familiar with general machine shop practices. This man may be found from among your older, stable machinists, one who knows company policy, but whose years set him apart from high production requirements.

CK MILLING MACHINE SPEEDS OUTPUT OF STANDARD PRODUCTION PARTS



THE FACTS ON THIS JOB ARE: Machine: No. 6 — Model CK Plain (25hp) with heavy-duty universal Milling Attachment. Part: Large fuselage spar fitting — overall dimensions 39-5/16" x 17-3/8". Material: Aluminum Alloy 75ST (forging). Tool: 2-inch, 2-lip end-mill. (HSS). Speed: 265 rpm. Feed: 3-1/8 ipm.

TEN ALUMINUM ALLOY 75 ST (FORGING) AIRCRAFT SPARS PRODUCED EVERY HOUR CK MILLING MACHINE FEATURES THAT HELP DO THIS JOB BETTER

- This CK milling machine has 24 different spindle speeds (13 to 1300 rpm), with 32 different table feeds (3/8 to 90 ipm). Operator was able to pick proper speed and feed, benefit from high horsepower modern tools.
- Greater rigidity of new CK column easily absorbs vibration from heaviest cutting loads. Only single pass needed for each part.
- CK's 3-bearing spindle and flywheel assures Maximum Cutter Efficiency. On this job, it meant fast metal removal and excellent finish in a single pass.
- CK's new heavy duty (2" dia.) table feed screw gives greater bearing contact for smoother feed performance and sustained accuracy.
- New CK machines have greater horsepower.

On this job, 25 hp permitted operator to get maximum production from this modern cutter.

HERE'S a typical example of how relatively inexpensive tooling greatly increases the versatility of Kearney & Trecker's new CK milling machines . . . producing a completed part every 6 minutes. Two operations were required for each part — (one) milling out the holes and recessing on the edges, then after changing the attachment setting and cutter — (two) finishing the inside (see photo). For the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.
FIND OUT HOW YOU CAN LEASE A NEW C.K. MACHINE. WRITE FOR BULLETIN TL10A.



2. It is well to set aside a small space in the tool crib or department where he can set up his files and direct kitting activities.

3. Operation Cards. Set up files to include numerically all operation cards according to part and operation number being routed through the machine shop. Avoid including operation cards on vendorized parts if possible. (Operation cards superseding existing operation cards through engineering or process change orders should be dispatched to these files immediately. From these files production receives the operation cards.)

4. Kit-cards. Kit supervisor now lays out his kit-card and sets up his kit-card files. Two $\frac{1}{4}$ " x 6" x 8" x 15" plywood boxes make ideal kit-card files. Label one box "Active" and one "Inactive."

5. Production control or the dispatching department is now instructed to release all production job orders with request for operation cards through the kit supervisor. The kit supervisor should have at least a two-hour lead factor on production job orders with the time specified when setup is required.

6. Upon receipt of the production job order the kit supervisor withdraws the operation card and from it fills out his

kit-card, listing all tooling. From the accountability, or tool location cards, he transfers the exact location of the tool in its crib location to the kit-card. He is careful to list the operation card issue number to his kit-card. As long as these issues correspond, his tooling will be right.

7. The completed kit-card is now clipped to the operation card and is given to a crib attendant who assembles the tooling into a kit per the kit-card.

Sturdy cardboard boxes 6" x 8" x 15" reinforced at the corners with steel clips make an inexpensive yet adequate delivery kit. It is well to maintain a supply of smaller boxes to incorporate plug gages, indicators, etc., for protection in kitting.

A four-wheel, basket-type cart such as is used in super-food-markets makes an ideal vehicle for delivery of kits to machines. Upon delivery of the kit to the machine by crib attendant or tool expeditor, the signature of the operator concerned is secured upon the kit-card. All tooling listed on the signed kit-card is charged against the signee on individual tool or accountability cards. The kit-card is then filed in the "Active" card file until the kit is returned.

8. When the operation has been com-

STOP DUSTS INSTANTLY

with

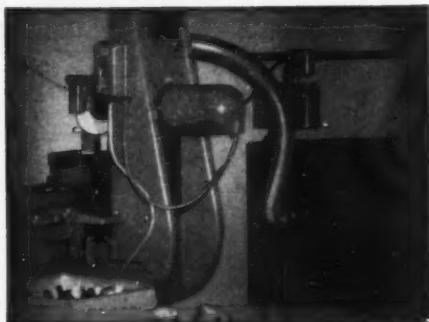
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pleted, the supervisor or job-setter notifies the kit supervisor. The original kit-card is withdrawn from the "Active" file and is turned over to the attendant or expeditor for tooling pickup. All tools listed on the kit-card are checked off at the machine at the time of pickup.

When the kit is returned to the crib, the tools therein are dispatched to either tool crib location, to cutter-grind, or to tool inspection.

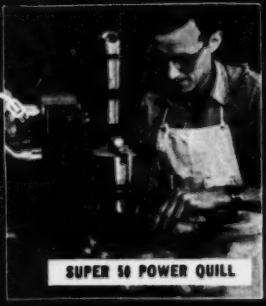
If a tool goes to cutter-grind, a zero (0) is inscribed in the "returned" column. If a fixture goes to tool inspection, an

(x) is inscribed in the "returned" column. In this way, the kit-card shows exactly where the tools are.

9. From the kit-card all tool cards or accountability cards are cleared. The disposition of the tool is up-to-date. The kit-card has completed its cycle and is placed in the "Inactive" file. This card with all pertinent tooling information up-to-date is as permanent as its operation card issue number.

The advantages of kitting are not confined alone to the reduction of lost man-hours in waiting for tools or relieving

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LOWEST COST
PRECISION
FOR TOOL ROOM AND PRODUCTION



SUPER 50 POWER QUILL

UP TO 45,000 R.P.M. AND $\frac{1}{4}$ H.P. ON AC/DC. Only PRECISE has the speed, power and precision needed to turn Tungsten Carbide Mills as well as all other rotary tools with shank diameters to $\frac{1}{4}$ ". Grind, mill, finish, polish any material from wood to the hardest alloy steel. MODELS SUPER 30 and SUPER 40 are for hand applications or machine set-ups; PRECISE SUPER 50 is for heavy duty in machine set-ups. Precision quills and chucks; lifetime-lubricated, micro-precision bearings; machined metal housings. Mounts and accessories for each model extend versatility on standard machine tools.



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congestion at tool crib windows. It reveals many concealed "bugs" that retard production. Bugs, that without the kit system, seem to defy classification.

Example: Process engineers are prone to use the term "standard tooling" very loosely. For instance, a processed operation card may read like this:

Chuck on .750 dia.; tooling, standard; description, turning tool—Turn .374 dia. to size; tooling, standard; description undercut tool—Form .035-.040 undercut; tooling, standard; description $\frac{3}{8}$ -24 chasers—Chase $\frac{3}{8}$ -24 thread; tooling, standard; de-

scription go and no-go ring gages.

The writer has seen process operation cards in four shops in the Middle West read similarly to the example above. What kind of a standard turning tool is required to produce the part? There are a number of different standard turning tools. There is the right or left hand straight carbide turning tool; the right or left hand offset carboloy turning tool; the box mill turning tool; the knee turning tool, etc. One of these turning tools may be the correct one. And if one is selected, will it have no radius on the

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point or will it need .010—.031 or $\frac{1}{8}$ " radius?

What distinguishes a standard tool from a special or T-number tool?

When confronted with the above mentioned .035—.040 wide undercut tool and was asked why he called this tool standard, the process engineer answered, "Because it is standard. Any ham-operator could make it."

This was a fast answer, but it was a misleading and gross over-statement. How could a tool crib attendant issue the correct tools to an operator on such vague information? Your kit system will quickly expose these discrepancies.

Broken or damaged tools and fixtures will immediately come to the attention of the kit supervisor who will question why because his job will be difficult until he gets your tooling straightened out.

The kit system will tend to bring about, through its natural functions, a more fused coordination between production control, small tool engineering, tool crib and production supervision. It will lead the kit supervisor unerringly to expensive trouble-spots in tooling that have been by-passed in a haphazard fashion. It will quickly demonstrate the necessity of seeing that the right man does the right thing at the right time.

The End.



"Call the welder. Ask him if he remembers the young apprentice who was helping him this morning."

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FURNACES FOR INDUSTRY

Tramrail System Provides Efficient Handling in Foundry

By Francis A. Westbrook

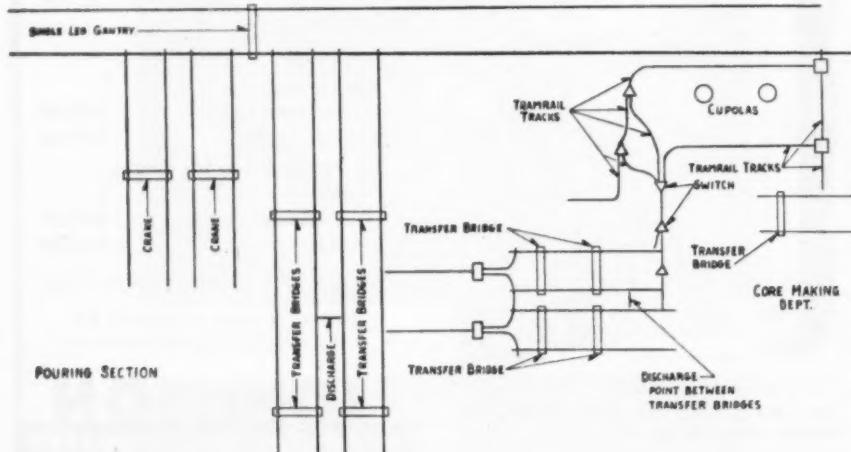
THE Landis Tool Company of Waynesboro, Pa., has equipped its foundry with an overhead tramrail system for the mechanical handling of certain castings, molds and so forth which resulted in greater production, safety and important cost reductions.

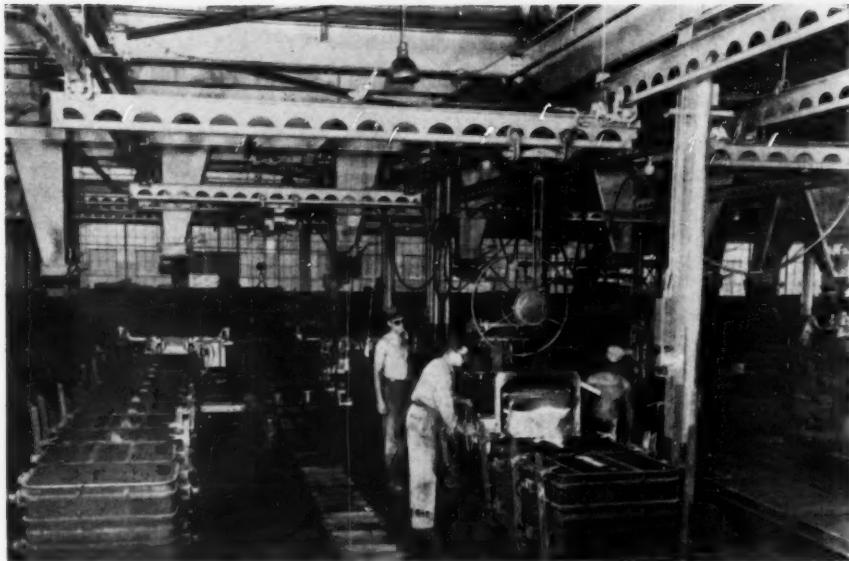
Some 2500 castings are poured in this foundry per month in connection with the production of the company's precision cylindrical grinders. These castings vary in weight from one ounce

to 31 tons, although most of them are under 4 tons. There are two cupolas, one 42 inches and the other 54 inches in size with a combined melting capacity of 1300 tons per month.

With such a volume of output and variety of sizes it is highly desirable to have adequate mechanical handling facilities. This has been accomplished by using different types of equipment, including roller conveyors, belt conveyors, power trucks, large overhead

1. Diagrammatic layout of tramrail system.





2. Pouring from ladles suspended from tramrail transfer bridge.

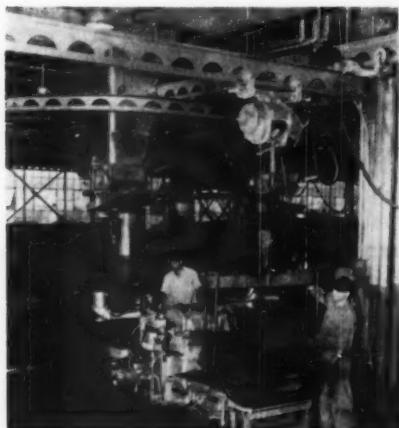
traveling cranes and the layout of overhead tramrail equipment for the large quantities of smaller castings, and the pouring ladles, which is considered here.

The general layout of the overhead

tramrail and track system is shown diagrammatically in figure 1. The capacity of the system is 1 ton and is hand propelled with air and electrically powered hoist carriers. In addition there is a 3 ton single leg gantry crane.

As will be seen from the diagram provision is made for very complete interlocking so that carrier hoists can travel over almost the whole system. Ladles to and from the cupolas travel over tramrail tracks and on to the transfer bridges as shown in figure 2. This method of handling the molten metal is fast from the production standpoint and also minimizes heat losses.

Heavy flasks are removed from the jolt and roll-over machines and delivered to the pouring line with a transfer bridge and an air-operated hoist,



3. Placing mold in pouring line with tramrail transfer bridge and air operated carrier hoist.



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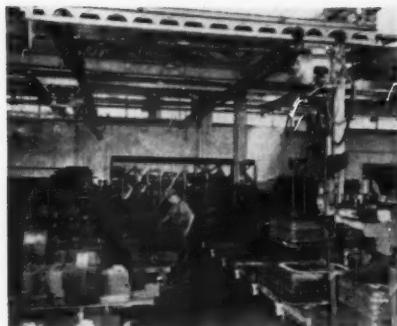
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4. Crane for handling line of molds.



5. Three-ton single leg gantry crane delivering poured molds to the shake-out.

figure 3. In the background of this photo is seen a single tramrail track forming part of the overhead handling system. Only one man is needed to handle the load in this way.

Figure 4 shows a crane serving a long line of molds. The air-operated hoist can be controlled closely enough so that two men are able to lower heavy copies gently on to the drags. These molds are placed on skids so that when they have been poured and are too heavy for these cranes they

may be taken to the shake-out by power fork lift trucks. Or if the molds are not too heavy the crane can deliver them to the single leg gantry crane, figure 5, or directly to the shake-out department. In the background of figure 5 is seen part of the tramrail track serving the cupolas.

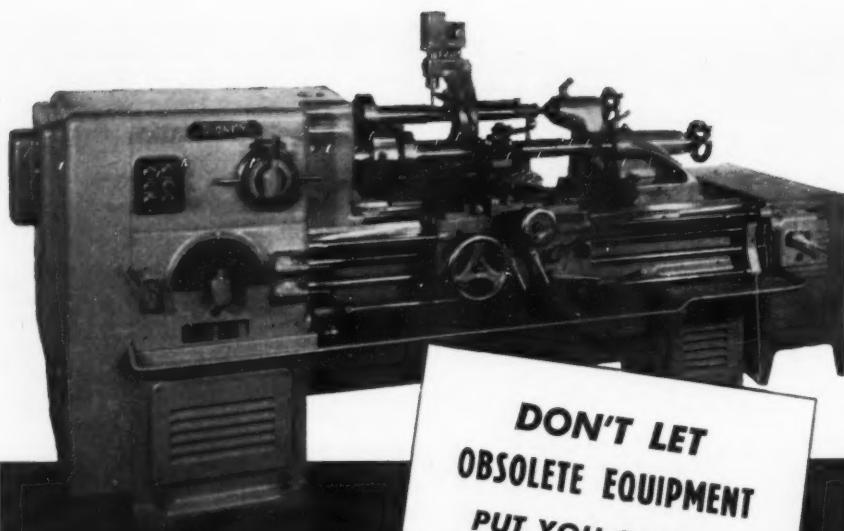
This single leg gantry crane is completely motorized and delivers poured molds up to 3 tons in weight to the shakeout. It is low enough to operate without interference under the heavy overhead cranes which handle the large castings.

Photos are through the courtesy of Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Photos are through the courtesy of Cleveland Crane & Engineering Co., Wickliffe, O.

The End.





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Plant Communications . . . Organizing the Flow of Ideas

By **Edmund Mottershead**, President,
Mottershead Associates
Chicago, Ill.

MANY industrial communications systems still resemble the unorganized and disorganized "grapevines" of the past because plant management has wrongly assumed that "everything is all set now" after a certain point of development is reached. They stand pat. They don't realize that a constant search for improvement is the only way to keep a communications program at maximum effectiveness.

We mentioned this general problem to Edward O. Dieterle, veteran management consultant, in his offices at the Thor Corporation's plant in Cicero, Illinois. He agreed that the communications activity **does** have to be looked upon as a continuing function that requires persistent scrutiny for flaws or shortcomings. And he told us of two

relatively new approaches to communications being utilized presently at Thor.

"No, you certainly can't afford to rest on your laurels," he said, "not when you're dealing with something as vital to the plant's welfare as a communications system. You have to keep looking ahead, and you have to be willing to try something new if the need for it exists."

"Here at Thor, we make maximum use of all the so-called 'old stuff'—house organ, bulletin boards, suggestion systems, plant tours, and conferences and meetings on all levels of plant life. We felt, however, that there were a couple of things we wanted to emphasize even more than these devices could practically do for us, so we devised two additional 'tools,' over and above the other

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things we're using. We felt the need was there, and we went ahead and fulfilled it."

Thus, in operation at Thor today are two "institutions" not usually included in "standard" lists of communications methods:

1. American economics classes
2. Departmental communications "monitors."

American Economics Classes

These classes are held for all the workers in the plant. They take place during working hours, and the problem of full and regular attendance is therefore non-existent.

The aim of these classes is to teach the employees the "economic facts of American life." They are not high-powered or partisan propaganda, but rather attempts to explain the American economic and social system.

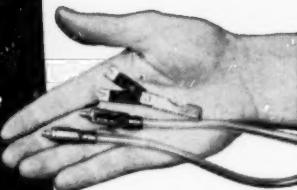
The intimate relationship between our social and political freedoms and our economic well-being is emphasized in the classes. The importance of production and ever-greater production to our standard of living is a running theme, and it is one that is being increasingly appreciated by Thor personnel.

It is felt that greater knowledge of our economic system and our industrial methods makes for more understanding and cooperation in the plant—better morale and stronger company loyalty.

Though not at all propagandistic in nature, the classes tend to reflect the viewpoint of management. In the first place, this is almost impossible to avoid, since it is management representatives who organize and conduct the classes. It is also true, however, that there is a definite justification (in terms of a good communications system) for workers seeing "management's side of the story."

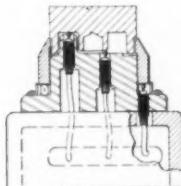
In order for truly good communications to exist, any latent hostile attitudes have to be done away with. This is a prerequisite of one aspect of com-

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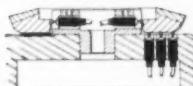


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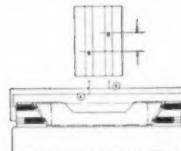
Gage Division, The Sheffield Corporation, Dayton 1, Ohio



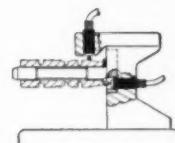
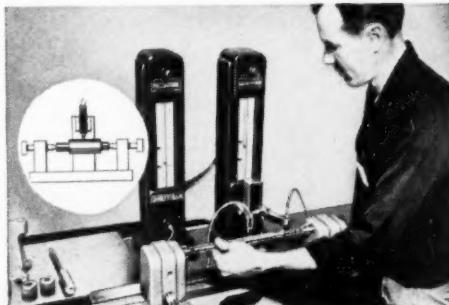
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munications and a result of another. On the one hand, a most efficient exchange of information and thinking cannot take place until hostile attitudes have been changed. On the other hand, hostile attitudes won't just automatically change themselves; some communications device must help develop more positive attitudes.

And such a "device" is the American economics program at Thor. Workers

are given an insight into management's point of view, but not in order to necessarily make them embrace it. Rather, the primary aim is that employees understand and appreciate management's outlook.

The success of the program so far has been heartening, according to Mr. Dieterle. Workers were asked to write out unsigned comments on the classes they attended, and the response has



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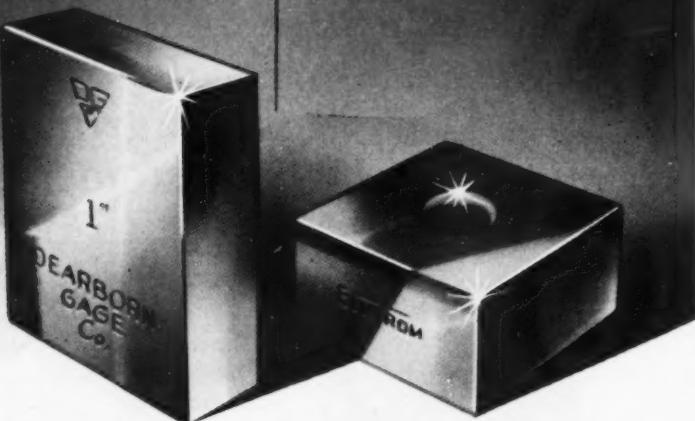


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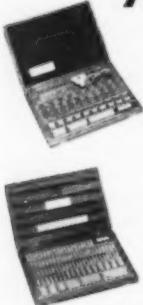
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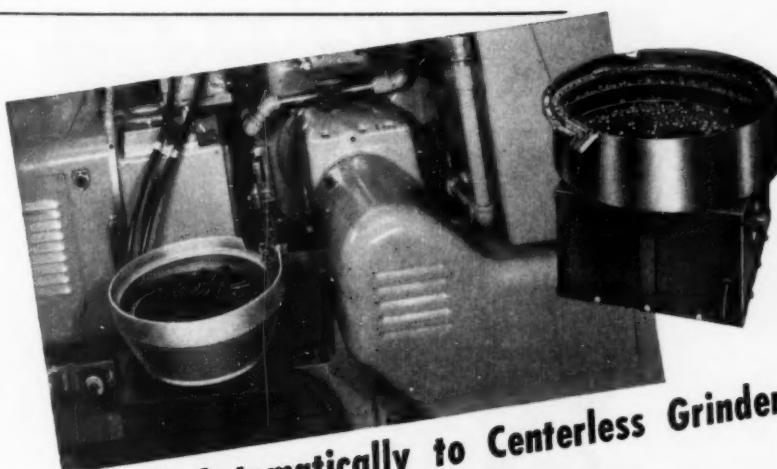
been overwhelmingly favorable. The fine results achieved at Thor should interest any plant that feels its personnel lacks understanding of our economic system and of "how top brass feels about things" in the possibility of developing a full program of regularly scheduled "American economics classes."

Departmental Communications "Monitors"

Thor has organized a plant-wide

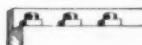
"communications committee," which deals solely and directly with the problem of the swift and frank exchange of ideas and feelings among all plant elements. Every department in the plant is represented on the committee by a "monitor."

This department representative fulfills a very vital function in the overall communications system. He is like the narrow middle of the old fashioned



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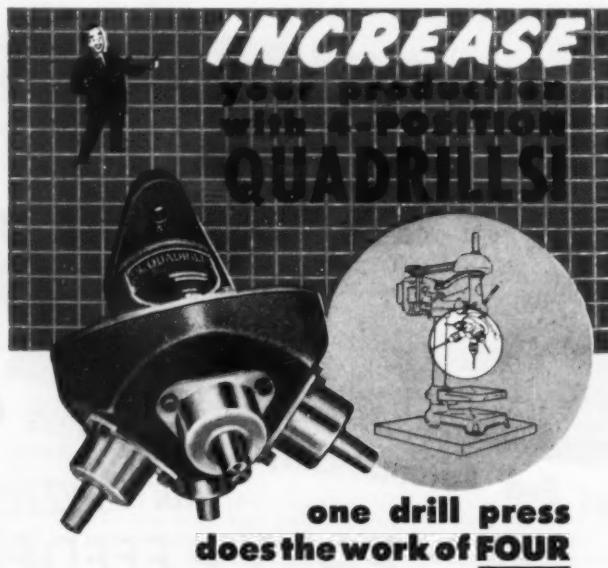
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hourglass in that he is the "funneler" of information and attitudes both from management levels to workers and from workers to management.

"We knew that despite the full communications system we were maintaining, many workers sometimes still exhibited extreme reluctance to speak out with what was on their minds," said Mr. Dieterle. "They either felt that

what they had to say was too insignificant to bring up, or they feared appearing in a bad light, or they felt that going to the department head or suggestion box was too formalized a procedure—whatever the cause, there was simply too much reluctance to freely speak out. So we set up a 'communications man' in every department.

"He has no official management title, in the strict sense of the term, and



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there is consequently a great deal less foreboding about going to him with a question or complaint or outright gripe. If a worker doesn't understand some minor item of our wage payment policy, he may very well shy away from "officially protesting" to the foreman about the matter. He will, in most cases, feel perfectly free about going to the department "monitor" with his question.

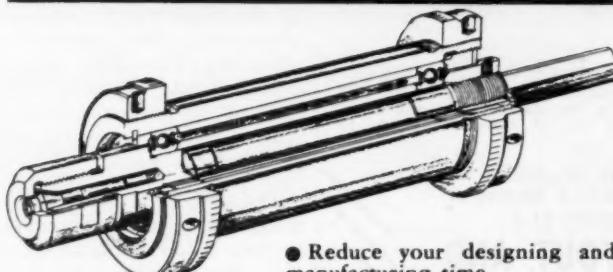
"This isn't just a lot of fancy theoriz-

ing, either. We've seen the thing work in actual practice, and we're getting much freer all-round communications as a result."

Each department's communications representative also acts as a carrier of management methods and policies to the worker level. His "unofficial" role helps here, too, for understanding is always promoted in an unrestrained "free-for-all" discussion of the type

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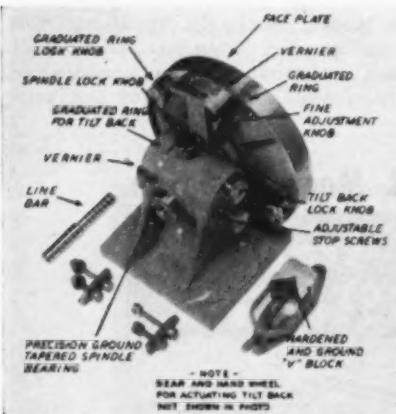
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that workers and department "monitors" often enter into.

The communications representative is entrusted with the responsibility of keeping ideas and thinking smoothly flowing both in and out of his department. This often involves going to the proper authority for the answer to a worker's question, or "feeling" the reaction of employees to new policies, or diplomatically and fully explaining changes in work methods or department organization to employees.

The communications committee, of which all department "monitors" are members, meets to discuss common problems and ways and means of solving them. Among other things, the meetings serve to keep the perspective of the department representatives plant-wide. The needs of the whole plant are thus kept foremost in the minds of the "monitors" and the functions of the particular departments are always looked upon in terms of the "good of the whole."

The individual monitors are workers who take on the communications task in their departments as an extra function. They are best able to inform employees and to be informed by them because they are themselves workers. According to Mr. Dieterle, the importance of this consideration to good communications cannot be over-emphasized.

As he put it: "The only way to really determine the worth of a program like this is in terms of solid results. And on the firing line—in on-the-job situations every day—our program is resulting in greater understanding, better morale, closer cooperation, and freer exchange of information between all elements in the plant. We here at Thor are definitely 'sold' on the idea."

The End.

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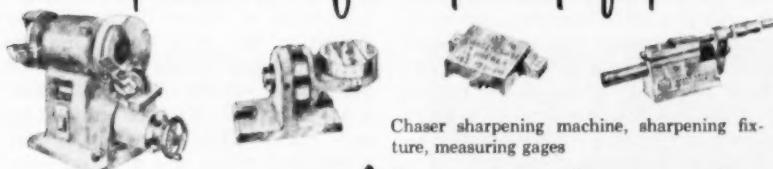
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Some Interesting Uses for Scrap

By Clifford T. Bower, Consulting Tool Engineer

SCRAP material, can be converted to useful components or converted for other uses if a little trouble is taken to study its possibilities and provide some simple tooling which will make its reworking a paying proposition. Provision of tooling is dependent to a great extent on the amount and the uniformity of size of the scrap pieces.

An example is the case of old railroad car coil springs which become scrap after a period of service because of cracks, permanent set, fatigue and loss of resilience. An outlet for the material of which coil springs are made is in the form of rough reinforcing rods for high stress concrete construction. The high tensile steel from which coil springs are made contributes a considerable amount of strength to concrete when used as a reinforcement.

The firm of Wm. E. Cary, Manchester, England, has a constant supply of scrap coil springs and has designed a machine for the decoiling of these for the production of reinforcing rods for concrete work. The rods find other uses apart from concrete work.

For decoiling, the machine comprises a backbone of structural I-section joist supported on three flat steel brackets bolted to the shop floor. One end of the backbone carries a strong vertical steel pillar which can revolve and has a lower flange on which the coil spring can stand. The spring is heated in a muffle furnace and dropped over the steel pillar. The lower end of the coil spring is gripped by a special pair of tongs which lock automatically when a pull is applied to their handle ends. The pull is provided by a steel cable, one end of which is attached to the tongs while the other end runs on to a low-speed cable drum attached to a 1½ h.p. electric motor incorporating a reduction gear unit.

When the tongs have travelled a few inches toward the cable drum, a split block is dropped into place on the backbone and this forms a rough die for imparting a straightening effect to the rod as it is pulled off the vertical pillar. When the spring has been converted to a comparatively straight steel rod, the tongs are detached and the

Old railroad car coil springs which have become scrap are uncoiled to make rough reinforcing rods for high stress concrete construction.



A simple bending machine utilizes scrap guillotine cut-offs of strip to bend it into annular rings.

rod is allowed to slide sideways off the backbone and into a sloping rack attached to the backbone side where it can cool.

Provision of simple tooling often enables scrap strip off-cuts from guillotine operations to be converted into useful components. Annular rings of sheet aluminum are very wasteful of sheet if they are blanked out in a press. The Nobel Division of Imperial Chemical Industries, Ltd., England, found this to be the case when they blanked out rims for safety fuse reels.

A workman's suggestion resulted in the simple bending machine, illustrated, which utilizes scrap guillotine off-cuts of strip form and permits them to be converted to annular rings. The ma-



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chine comprises a circular plate with a stepped rim and this is rotatably mounted on a spindle projecting vertically from a stand secured to the shop floor. A lever for rotating the plate projects horizontally from underneath and a ratchet mechanism enables it to be operated in the most convenient manner.

Strips have a hole punched through one end and are secured by this to the rim of the plate by means of a single countersunk head machine screw engaging with a tapped hole in the plate. A smaller flanged plate is mounted on a fixed spindle adjacent to the main plate so that its rim rests on top of the strip material. Rotation of the large plate by means of the lever causes the strip to be rolled into the form of an annular ring.

The small forming plate can be detached quickly from its spindle by pulling out a pin fitting in a cross-hole. After the ring has been roughly formed, the wrinkles are ironed out by rotating the large plate a few times.

The End.



The U.S. Standard Gauge

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Number of Gauge	IRON		STEEL	
	Thickness in Inches	Thickness in Millimeters	Thickness in Inches	Thickness in Millimeters
0000000	.5	12.7	.4902	12.45
000000	.46875	11.9062	.4596	11.67
000000	.4375	11.1125	.4289	10.89
000000	.40625	10.3187	.3983	10.13
000000	.375	9.525	.3676	9.33
000000	.34375	8.7312	.3370	8.56
000000	.3125	7.9375	.3064	7.78
000000	.28125	7.1437	.2757	7.00
000000	.25625	6.7468	.2604	6.61
000000	.225	6.35	.2451	6.23
000000	.20375	5.9531	.2298	5.83
000000	.1875	5.5562	.2145	5.35
000000	.203125	5.1593	.1991	5.07
000000	.1875	4.7625	.1838	4.67
000000	.171875	4.3656	.1685	4.28
000000	.15625	3.9687	.1532	3.89
000000	.140625	3.5718	.1379	3.50
000000	.125	3.175	.1225	3.11
000000	.109375	2.7781	.1072	2.73
000000	.09375	2.3812	.09191	2.33
000000	.078125	1.9843	.07659	1.945
000000	.0703125	1.7859	.06893	1.750
000000	.0625	1.5875	.06127	1.555
000000	.05625	1.4287	.05515	1.400
000000	.05	1.27	.04902	1.245
000000	.04375	1.1112	.04289	1.089
000000	.0375	.9525	.03676	.933
000000	.034375	.8731	.03370	.856
000000	.03125	.7937	.03064	.778
000000	.028125	.7143	.02757	.700
000000	.025	.635	.02451	.623
000000	.021875	.5556	.02145	.535
000000	.01875	.4762	.01838	.467
000000	.0171875	.4365	.01685	.428
000000	.015625	.3968	.01532	.389
000000	.0140625	.3571	.01379	.350
000000	.0125	.3175	.01225	.311
000000	.0109375	.2778	.01072	.273
000000	.01015625	.2579	.009957	.252
000000	.009375	.2381	.009191	.233
000000	.00859375	.2182	.008425	.2139
000000	.0078125	.1984	.007659	.1945
000000	.00703125	.1785	.006893	.1750
000000	.006640625	.1686	.006510	.1653
000000	.00625	.1587	.006127	.1555

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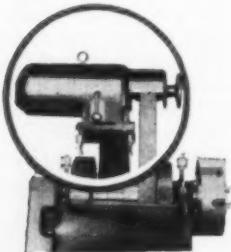
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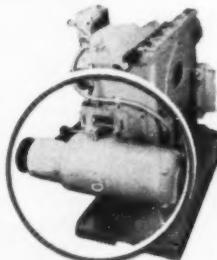
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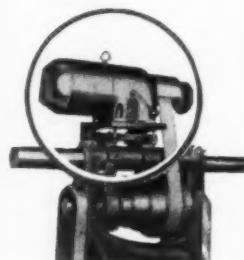
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The U.S. Standard Gauge

For All Uncoated Sheets and Plates of Iron and Steel

(continued)

Number of Gauge	Weight per Sq. Foot in Oz.	Weight per Sq. Foot in Lbs.	Weight per Sq. Foot in Kilo.	Weight per Sq. Meter in Kilo.	Weight per Sq. Meter in Lbs.
0000000	320	20.	9.072	97.65	215.28
000000	300	18.75	8.505	91.55	201.82
00000	280	17.50	7.983	85.44	188.37
00000	260	16.25	7.371	79.33	174.91
0000	240	15.	6.804	73.24	161.46
000	220	13.75	6.237	67.13	148.00
00	200	12.50	5.67	61.03	134.55
0	180	11.25	5.103	54.93	121.09
1	170	10.625	4.819	51.88	114.37
2	160	10.	4.538	48.82	107.84
3	150	9.375	4.252	45.77	100.91
4	140	8.75	3.969	42.72	94.18
5	130	8.125	3.685	39.67	87.45
6	120	7.5	3.402	36.62	80.72
7	110	6.875	3.118	33.57	74.00
8	100	6.25	2.835	30.52	67.27
9	90	5.625	2.552	27.46	60.55
10	80	5.	2.268	24.41	53.82
11	70	4.375	1.984	21.36	47.09
12	60	3.75	1.701	18.31	40.36
13	50	3.125	1.417	15.26	33.64
14	45	2.8125	1.276	13.73	30.27
15	40	2.5	1.134	12.21	26.91
16	38	2.25	1.021	10.99	24.22
17	32	2.	.9072	9.765	21.53
18	28	1.75	.7983	8.544	18.84
19	24	1.50	.6804	7.324	16.15
20	22	1.375	.6237	6.713	14.80
21	20	1.25	.567	6.103	13.46
22	18	1.125	.5103	5.493	12.11
23	16	1.	.4536	4.882	10.76
24	14	.875	.3969	4.272	9.42
25	12	.75	.3402	3.662	8.07
26	11	.6875	.3119	3.357	7.40
27	10	.625	.2835	3.052	6.73
28	9	.5625	.2551	2.748	6.05
29	8	.5	.2268	2.441	5.38
30	7	.4375	.1984	2.136	4.71
31	6 1/2	.40625	.1843	1.983	4.37
32	6	.375	.1701	1.831	4.04
33	5 1/2	.34375	.1559	1.678	3.70
34	5	.3125	.1417	1.526	3.38
35	4 1/2	.28125	.1276	1.373	3.03
36	4 1/4	.265625	.1205	1.297	2.87
37	4	.25	.1134	1.221	2.69

BLUE BOOK'S **Know How** **Reference Sheets**

**Length of Steel Coils in Feet for Each 1000 lbs.
of Weight**

U. S. Standard Gauge	Thickness in Inches	Weight Per Square Foot, Lbs.	12 Inches Wide	18 Inches Wide	24 Inches Wide	30 Inches Wide
0	.3125	12.50	80.	53.3	40.	32.
1	.28125	11.25	88.8	59.2	44.4	35.5
2	.265265	10.625	94.1	62.7	47.05	39.9
3	.25	10.0	100.	66.6	50.	40.
4	.234875	9.875	106.6	71.1	53.3	42.3
5	.21875	8.75	114.28	76.19	57.14	45.7
6	.203125	8.125	123.07	82.05	61.5	49.23
7	.1875	7.5	133.3	88.8	66.6	53.8
8	.171875	6.875	145.45	96.9	72.7	58.18
9	.15625	6.25	160.	106.67	82.4	64.
10	.140625	5.625	177.7	118.5	88.8	71.1
11	.125	5.0	200.	133.3	100.	80.
12	.109375	4.875	251.4	152.3	114.2	91.42
13	.109375	3.75	266.6	176.	133.3	106.6
14	.078125	3.125	320.	213.3	160.	128.
15	.0708125	2.8125	355.5	237.03	177.7	142.2
16	.0625	2.5	400.0	266.6	200.	160.
17	.05625	2.25	444.	296.2	222.	177.
18	.05	2.0	500.	333.3	250.	200.
19	.04375	1.75	571.4	380.9	285.6	228.5
20	.0375	1.50	666.6	444.4	333.3	266.6
21	.034375	1.375	727.2	484.8	363.6	290.9
22	.03125	1.25	800.	533.3	400.	320.
23	.028125	1.125	888.8	592.5	444.4	355.5
24	.025	1.00	1000.	666.6	500.	400.
25	.021875	.875	1142.8	761.1	571.4	457.1
26	.01875	.75	1333.3	888.8	666.6	533.8
27	.0171875	.6875	1454.5	969.6	730.1	581.8
28	.015625	.625	1600.	1066.6	800.	640.
29	.0140625	.5625	1777.7	1185.2	888.8	711.1
30	.0125	.5	2000.0	1333.3	1000.	800.
31	.0109375	.4375	2285.7	1523.8	1142.8	914.2
32	.01015625	.40625	2461.5	1641.0	1230.7	984.6
33	.009375	.375	2666.6	1777.7	1333.3	1066.6
34	.00859375	.34375	2909.09	1939.39	1454.54	1163.63
35	.0078125	.3125	3200.0	2133.3	1600.	1280.

BLUE BOOK'S **Know How** Reference Sheets

**Length of Steel Coils in Feet for Each 1000 lbs.
of Weight**

U. S. Standard Gauge	36 Inches Wide	48 Inches Wide	60 Inches Wide	72 Inches Wide	84 Inches Wide	96 Inches Wide
0	26.6	20.	16.	13.3	11.4	10.
1	29.6	22.2	17.7	14.8	12.7	11.1
2	31.37	23.5	18.8	15.6	13.4	11.7
3	33.3	25.	20.	16.6	14.28	12.5
4	35.6	26.6	21.3	17.6	15.2	13.8
5	38.05	28.5	22.8	19.04	16.8	14.28
6	41.02	30.76	24.61	20.51	17.58	15.88
7	40.	33.3	26.6	22.2	19.45	16.6
8	48.4	36.3	29.09	24.2	20.7	18.18
9	53.8	40.	32.	26.6	22.85	19.9
10	59.2	44.4	35.5	29.6	25.89	20.
11	66.6	50.	40.	33.3	28.56	25.
12	76.7	57.14	45.7	38.09	32.6	28.57
13	88.8	66.6	53.3	44.4	38.09	33.8
14	106.6	79.9	64.	53.3	45.7	40.
15	118.5	88.8	71.1	59.2	50.28	44.4
16	133.3	99.9	80.	66.6	61.14	50.
17	148.1	111.	88.8	74.07	68.5	55.
18	166.6	125.	100.	83.3	71.4	62.5
19	190.4	142.8	114.2	95.2	81.5	71.4
20	222.2	166.6	133.3	111.1	95.2	83.8
21	242.4	181.8	145.4	121.2	103.8	90.9
22	266.6	200.0	160.	133.3	114.2	100.
23	296.2	222.2	176.	148.1	120.69	111.1
24	333.	250.	200.	166.6	142.8	125.
25	380.9	285.7	228.5	190.4	163.2	142.8
26	444.4	333.3	266.6	222.2	190.4	166.6
27	484.8	363.6	290.9	242.4	207.7	190.
28	533.8	400.	320.	266.6	228.5	202.4
29	581.2	444.4	355.5	296.2	253.9	222.2
30	666.6	500.	400.	333.3	285.6	250.
31	761.9	571.4	457.1	380.9	326.5	285.6
32	820.5	615.3	492.3	410.2	351.6	307.6
33	888.8	666.6	533.3	444.4	380.9	333.8
34	969.69	727.27	581.81	484.84	415.58	363.63
35	1066.6	800.	640.	533.3	457.14	400.

Shop HINTS



Hoist Production, Save Time by Revamping Hand Screw Machine Setups

By Harold D. Rhodenbaugh

IS IT ENOUGH JUST TO GET GOOD PARTS from your hand screw machine departments? No. Can these departments be made to increase production without creating labor trouble or unrest? The answer is "yes." Walk through a turret lathe department and look at the setups. Here is a No. 1, 2, 3, or 4 Warner & Swasey hand screw machine set up to produce a "screw." All six positions on the hexagon turret are toolled, figure 1: No. 1 position is a center drill extending 4" out from the turret face; No. 2 is a drill, 12" out from the turret face; No. 3 position is a boring bar, 8" out from the turret face; No. 4 is a counter-bore extending five inches out from the turret face; No. 5 position is a reamer, 15" out from the turret; No. 6 is a turret stop that extends out 9" from the turret face.

The hexagon turret head or carriage is set back from the end of the work piece to permit the longest tool, the reamer, to clear 3".

With the tools properly set to size, this turret setup will produce good parts. But at what cost? How much is wasted on each cycle while these tools are being indexed and traveling these varied lengths to the start of their cut?

Far too much time is wasted in tool travel. Furthermore, this is an awkward setup that no operator could skillfully execute. The efficient indexing of a hexagon turret is a skill that pays off in increased production if the setups are right. Yet many industries are guilty of this extravagance in hand screw machine setups and in many cases time-study engineers do not see discrepancies.

One may correct this setup by using turret flanges and tool holders designed particularly for establishing uniformity of length, thus cutting to a minimum

human energy and motion to bring each tool to its point of contact with the work.

With all turret tools extending an approximate equal distance from the turret face, we now loosen up the eight studs beneath the ways and move the turret head toward the work, allowing about 1" clearance between the most extended tool and end of the work, figure 2.

Every day one sees other setup errors obvious to the trained eye, but unseen by many supervisors and time-study men.

In figure 3, we are working on another tube. The sequence of hexagon turret

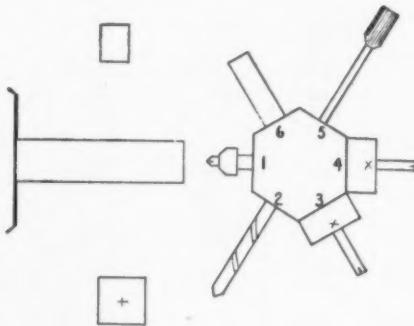


Fig. 1



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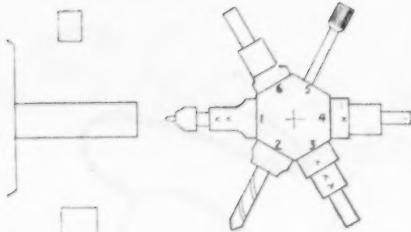


Fig. 2

operations is: Station 1, C'drill; station 2, drill; station 3, ream. There is one more operation required to put a $1/16 \times 45^\circ$ chamfer on the end o.d. of the tube. This operation is set up in the square turret on the cross slide.

Its natural position should fall on station 4 in the hexagon turret in a knee tool holder M-1863. Mounted thus, the 45° chamfer can be established and the tube removed from the machine in less time than that required for the operator to crank the square turret into position to form a chamfer.

Another outstanding error in screw ma-

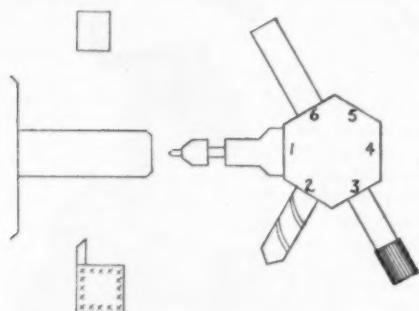


Fig. 3

chine setups is that of using a chuck when the tolerances and quantities of pieces to be produced are such that a collet could be used.

In bar stock work collet clamping should always be used where practical because collets are production tools.

However, there are chucking applications on bar stock where deviations are not practical.

For example, deep boring operations where concentricity tolerances are held

within .001 to .003 are better done in a chuck with soft jaws bored in to .0003 to .0005. Again bore diameter tolerances under .002 should be done in a chuck with a boring tool mounted in the back tool post on the cross slide.

The back tool post on the cross slide is always a safe station for boring diameters within the tolerance range of .0003 to .002. Avoid boring from the square turret on close tolerances if possible. There is too much chance of indexing error.

Where depths of bore or lengths of turns are .002 tolerance or under, it is well to use a chuck to eliminate the forward or backward thrust of collet locking. In most other instances, tool to work in the collet from the hexagon turret.

Boring from the hexagon turret is usually done with a vertical slide mounted on the turret. Always mount the boring cutter up to the centerline or down to the centerline. For heavy cuts centerline up is advisable to insure rigidity and thus avoid taper or rough and wavy finishes. If the machine is shut off, allowing the spindle bearing to cool, the spindle will drop causing the bar to bore oversize. Always warm up the machine before starting a cut or better still, lower the bar .010 and pick up size as the machine warms up.

Turning: Jobsetters, supervisors, foremen, and time-study engineers should be advised, in short turning operations, to consider first, turning from the hexagon turret. Where application is practical, the hexagon turret is the production end of a turret lathe.

In setting turning tools in a knee tool holder or vertical slide tool holder, as in boring, it is necessary to maintain the centerline up. Otherwise taper, chatter, unsatisfactory finish or variation in size will result.

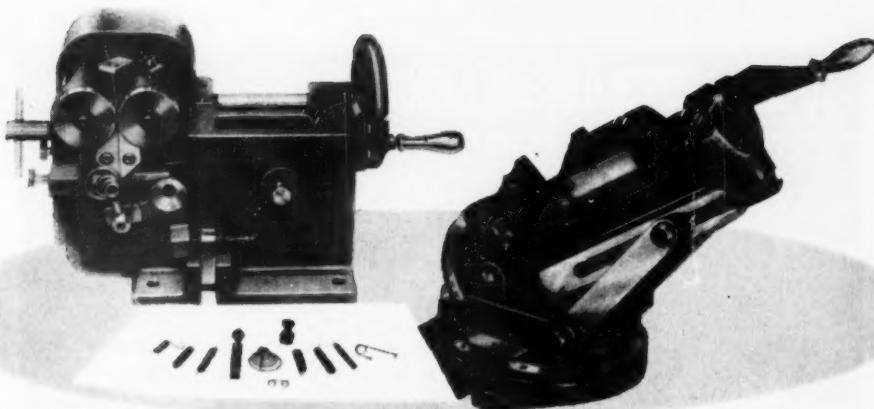
Setting to the centerline in any tool holder is a must if satisfactory results are to be obtained.

Volumes have been written on the correct grinding angles, rakes, clearances, and radii for cutting tool application. Too little has been written on tool application in relation to arranging cutting sequence, taking full advantage of cutting tool accessories and their relationship to the machine upon which they are to be used.

Removing broken dowel pins effectively without damaging hole

By Roger Isette

When a dowel pin breaks off in a blind hole, it is a difficult job to remove it, particularly if it is a heavy press fit. If



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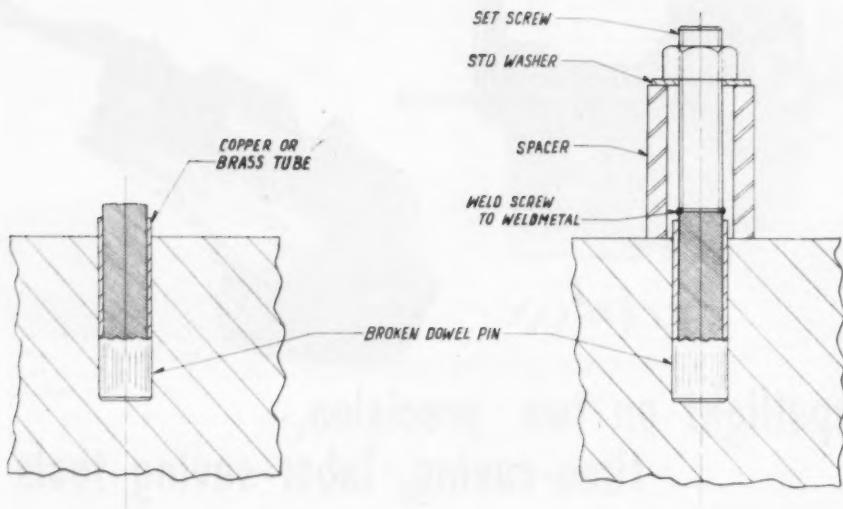


FIG. 1

FIG. 2

it is in an expensive part such as a die or punch section or in a machine, it must be removed without damaging the hole or the surface of the piece.

The illustrated method of removing the broken off dowel has been successfully used on a number of occasions by the toolroom at the Nash Motors automotive plant in Kenosha, Wis.

First, a length of brass or copper tubing is inserted into the hole and rests directly on top of the dowel as shown in Fig. 1. Weld is then built up inside the tube until it projects above the tube. The

reason copper or brass is used is because weld won't stick to it. After the weld cools, a standard headless set screw is butt welded directly to the projecting end of the weldmetal as illustrated in Fig. 2. A spacer collar, which can be a piece of pipe or a bushing that can usually be found lying around most toolrooms, is placed over the set screw and a standard washer placed on top. A hex nut is then tightened against the washer which in turn will draw the tube and dowel out without damaging the piece in any way.

Lathe fixtures for concentric tapping with turned pieces

By Wm. C. Betz

On many occasions when turning work in an engine or turret lathe the part must be tapped concentric with the turned pieces. If made for a turret lathe a straight shank instead of the binder A is in order.

The fixture A may be made to take taps of various sizes through the squared bushings which are made as follows: A piece of round steel about an $\frac{1}{8}$ " over finish dia. of the bushing and about $1\frac{1}{8}$ " long is sawed in two through the center lengthwise; the halves are held in a miller vise and with a 90° angle milling cutter,

they are milled to suit the square of the tap shank less about $1/32"$; the two halves are clamped with a lathe dog or a collar, as shown, to a rod equal to the square of the tap; the clamp is placed so that over half of the piece is exposed for turning, the rod is held in a spring collet of the lathe and the forward half is turned to fit the bore of the tapping fixture; dog is removed and placed on the turned end.

The bushing is cut in two with a cutting-off tool, making two bushings of a size.

In the case of the holder A, clamping it to the tailstock spindle of the lathe gives greater rigidity and quicker re-

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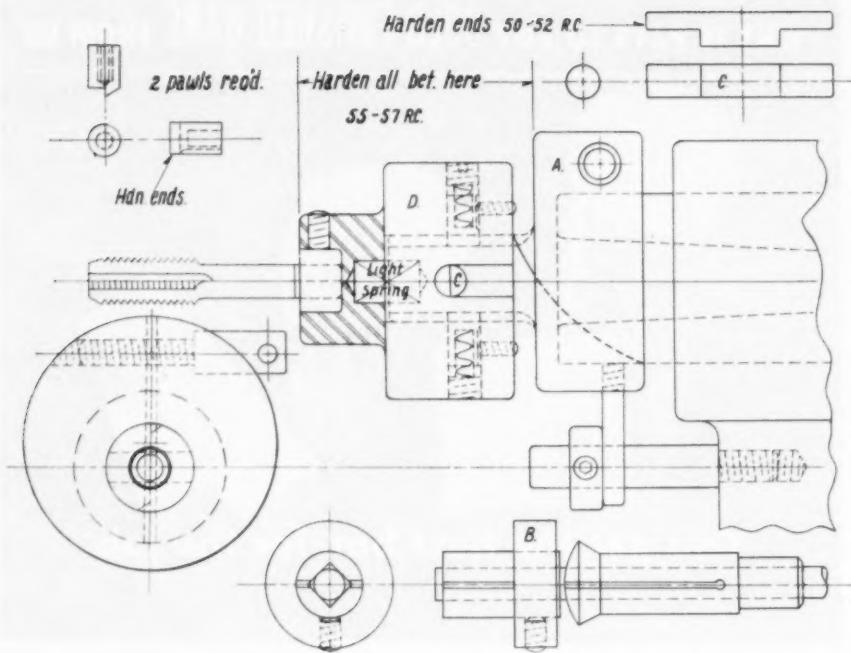


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moval than if it were made with a shank to fit the taper.

Another reason for wanting quicker removal is to change to a drill chuck as this is generally required in conjunction with tapping. The chuck could be mounted on a bracket similar to the tapping device.

In tapping, the stop B is adjusted so that the tap enters the work to a given depth when the pin C leaves the slot and in so doing the tap and part D revolve on the stud of part A; as D revolves the two pawls in it slip and when the machine spindle is reversed these pawls lock tap holder D to A, allowing the tap to work out of the work and pin C to re-enter its slot for the next operation of tapping.

The light spring between D and A keeps the tap snug when starting in a piece of work without pin C bottoming in the end of the slot.

Boring machine cutter adjustment speeded by unique gage

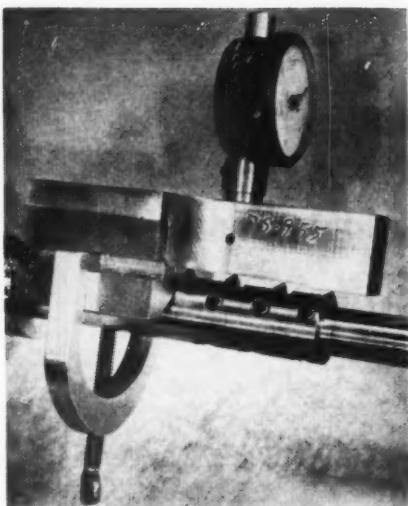
Adjustment of boring machine cutters at Temco Aircraft Corp., Dallas, has been speeded and simplified by means of a unique gage that a first-day employee can operate.

Temco's gage allows cutters to be set to within ".0001" of desired position in a few minutes time.

It is constructed to adjust cutters to only one setting, and is used only in cases where bore radius is constant for a large volume of work.

Need for a gage of this type was noticed by operators of an Ex-Cell-O boring machine used to bore a standard hole in a large number of castings. Boring cycle required only 14 min., but it sometimes took operators the same amount of time between cycles to mike-check the adjustment of the three cutters on the bore rod.

Micrometers also caused occasional



damage to brittle carbide tips on the cutters, and their accuracy depended, to some extent, on the user's experience.

Precision Bench Mechanic T. J. Kittrell

sketched an idea that resulted in the gage now in use.

It is a combination step-dial indicator gage, mounted on a small V-block. A V-block clamp fits in slots on the block's sides and secures the entire $4\frac{1}{4}$ " by $1\frac{3}{4}$ " tool steel device on the bore rod.

The stepped part of the gage overhangs the cutters when the gage is secured to the bore rod. Each of the gage's three steps is cut so it marks the desired radius of sweep for its respective cutter. Cutters are adjusted by set screws so their tips touch the steps.

For the third cutter—the one that makes the last, deepest and most exacting cut—a .0005" dial indicator gage is used to provide extreme accuracy.

The indicator is mounted on top of the step gage. It is actuated by a plunger which the cutter tip touches when it is flush against its step. Temco operators have adjusted the gage so it reads "0" when cutter adjustment is correct within .0001".

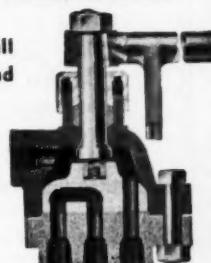
Since this gage has been in use, hand-honing after boring hasn't been necessary, and setup time has been reduced at least $\frac{1}{2}$ hour a day.

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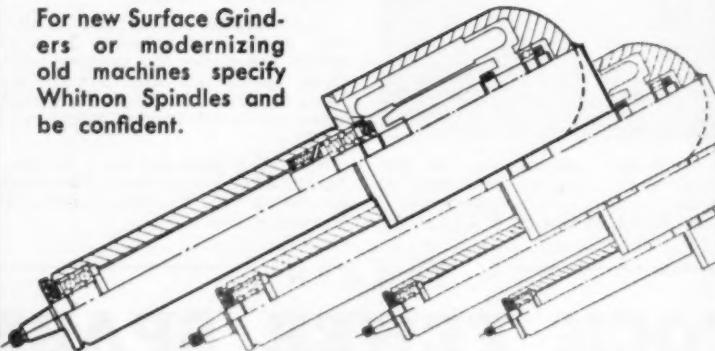
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Development Program Proves Practicality of Carbide Tooling for Multiple Spindle Bar Automatics

SUCCESSFUL use of cemented carbides in overcoming several obstacles of the "production line in a circle"—the automatic bar machine—has been recently proven in development programs and now reported to the machining industry for the first time.

Engineers of Cone Automatic Machine Co., Inc., Windsor, Vt., and Carboly Department of General Electric Co. of Detroit, working jointly in a four-month-old continuing development program—learned how to make effective use of cemented carbides on multiple spindle bar automatics—among the last of the machine tool carbide-holdouts.

Although the joint development program is barely beyond its initial stages, it has made great strides in a short period of time. In a nutshell, here's what the engineers found:

- 1. Multiple tool setups of automatic machines are not barriers to cemented carbides.**
- 2. Tool holders, as well as auxiliary attachments, should be engineered to meet job conditions of automatics.**
- 3. Proper selection of carbide grades and correct tool geometry are more important in applying carbides to automatics than to other machines.**
- 4. Adequate horsepower to the work spindles is essential.**
- 5. A good method of supplying a gen-**

erous amount of water-based coolant to the cutting areas is a must.

In the past, attempts to apply cemented carbides to automatic bar machines proved unsuccessful because neither the users nor machine tool builder could afford the time, due to the production schedules, to delve into the compounded problems created by the "automatic production line."

To date cemented carbides have been successfully applied to practically every turning type of production machine tool with the exception of the multiple spindle bar automatic. Among the reasons automatics have been slow in receiving general acceptance in this field are: 1. Certain machine deficiencies—which have made necessary certain alterations and changes; 2. The complexity of multiple spindle bar automatics, compared to other members of the lathe family, which made the introduction of carbides to more simple machines a logical first procedure; 3. The fact that all tools on a multiple spindle machine work simultaneously, and are dependent on each other, causes all tools to be down when one is down. Also that single spindle machine tools permit replacement of one tool often without interfering with the work of other tools; 4. The low cost production advantage of multiples over single spindle machines with high speed steel

Fig. 1. Two 7 1/4" leveling screws for machine tools are produced every 7 seconds on this 50-hp, 1 1/8", 6-spindle Cone automatic tooled up with Carboly grade 370 carbide. The work is produced from 1" SAE B1112 steel stock.



tools, both as to volume of work pieces produced, and the completion of work in a single chucking to eliminate second handling machining operations, has maintained a market for multiples without the use of carbide tools; 5. Multiple spindle setups involve greater losses when a machine is down for machine repairs than do single spindle setups; 6. New tool techniques and knowledge in regard to carbide require proper training to satisfy the needs of production supervisors, foremen, setup men, and operators; 7. An amount of experimentation is necessary, and production men feel that such should be made by the multiple bar automatic builder, or by the carbide tool manufacturers, or preferably by both.

Experience was drawing automatic machine users away from automatic machines and steadily toward non-automatic machines. To meet the situation, Cone as well as other automatic builders "souped up" the machines as far as possible with high speed steel cutting tools. The companies also struggled to transform the machines into push-button affairs to both meet the cry for more speeds and feeds, and to get away from human errors of poorly trained operators.

But these were not the answers.

Today, as a result of the joint automatic machine-cemented carbide development program of Cone and Car-

bloy, the introduction recently by the latter of new cemented carbide grades such as the series 300 (grades 350 and 370) especially suited for continued, high speed operations, the answers are beginning to show up.

They found that machine weight, for example, was important, but not as important as where that weight was distributed to provide rigidity. It also was found to be a natural for more horsepower, and able to distribute that power through the spindle.

As most multiple spindle setups are individualized it was agreed to seek for development actual jobs that made use of the commonly known tools, and at the same time jobs that were representative of volume production by the machine. For example, one machine was tooled up to make use of end and side tools that are familiar to all users of "automatics." Another was set up to handle 52100 tubing in the production of ball bearing inner races. And a third machine was set up to handle the type of threading that can be accomplished with carbide tipped die head chasers.

In tackling the threading job—a 7 1/4" long leveling screw for an automatic machine from 1" diameter steel screw stock (SAE B1112)—the joint engineering task force tooled a 1 1/8" 6-spindle 50 hp automatic with Carboly grade 370 carbide.

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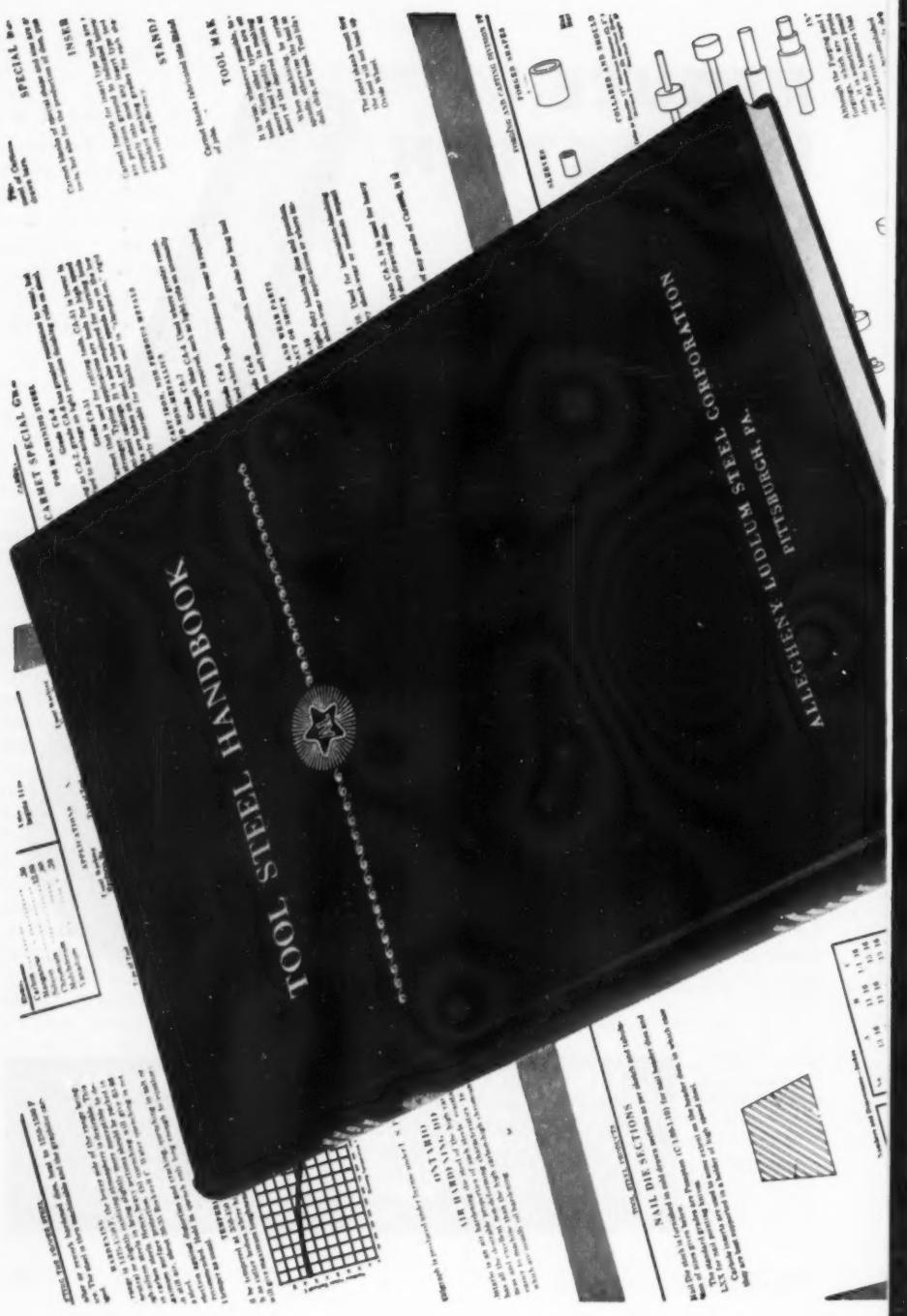
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Fig. 2. Left, two leveling screws produced in 7 seconds by carbide tooled automatics, center, standard inner race bearing; right, shutoff valve center produced by automatic, Fig. 3 (a).

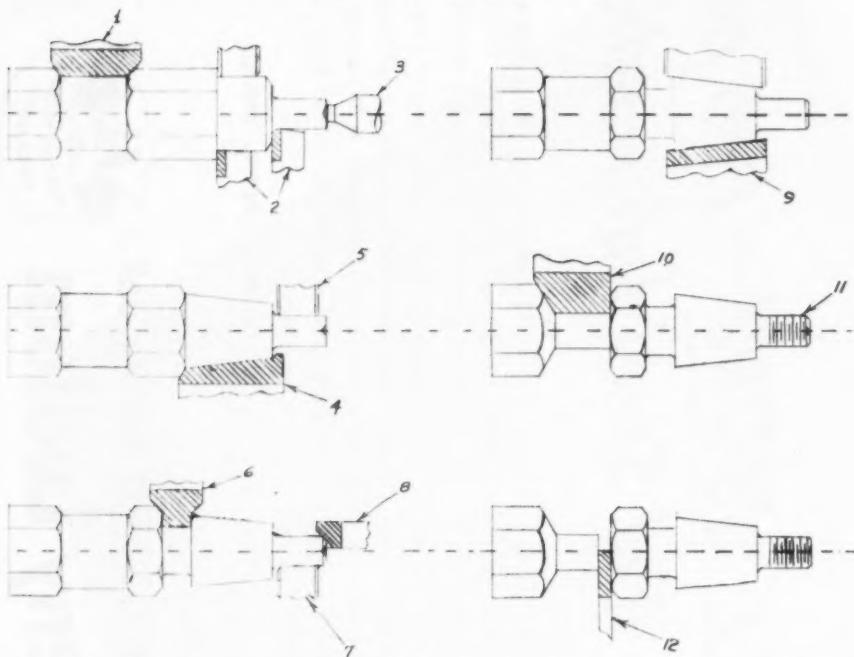


Fig. 3. Spindle and tooling setup for 6-spindle automatic for producing oil shutoff valve. Cross hatching shows carbide tipped cutting tools at the six spindle positions: 1. form; 2. two-tool roll turner; 3. spot drill; 4. finish form; 5. roll support; 6. finish form groove; 8. butt face, shank type; 7. roll support; 9. shave attachment; 10. radius form; 11. threading attachment; 12. cutoff.

In production, the machine produced the screws at the rate of two every 7 seconds, or 994 screws per hour. With high speed steel tools, the machine was capable of providing only 140 pieces per hour.

During the operation, the machine generated a direct spindle speed of 958 rpm, a die spindle speed of 628 rpm—providing a total effective spindle speed of 1586 rpm for threading.

Both chamfer and cutoff carbide tools provided 700 pieces per grind, the threaders producing 1000 pieces per grind. The feeds of both the chamfer and cutoff were 0.005".

Until now, threading was always considered one of the big road blocks for carbides on automatics.

Some of the other interesting aspects of the job are: Only half as many cutting tools as formerly required are used

on the job. Also it is unusual to feed out and thread a piece of this length—especially when feeding two pieces simultaneously.

Carboloy and Cone engineers point out in addition that many jobs running on 4-spindle machines, like the leveling screw, can easily be adapted to 6-spindle automatics with a terrific boost in production.

In tooling up a second machine—a 50 hp, 2½" 6-spindle automatic—with Carboloy grade 370 cemented carbide, the engineering team produced standard inner bearing races at the rate of one every 10 seconds, or six bearings per minute. Previously, with high speed tools, the production time reported was about double.

The bearing race, which had an outside diameter of 2¼" and inside diameter of 1½", was produced from SAE 52100 steel tubing with only seven carbide cutting tools, half as many required when using high speed cutting tools.

The work, in this case, was run at a speed of 519 rpm or 333 sfpm. Tool life for the operations were: 724 pieces per grind for internal necking, 1270 for butt facing, 1518 for breaking down for cutoff, 1890 for vertical cutoff, 810 for forming, 720 for cutoff and 1270 for reaming.

In producing the center of an oil shutoff valve on a third 50 hp automatic, the production rate was boosted with carbides to one every 8 seconds. Formerly, high speed steel tools produced only one center every 45 seconds.

In this case, two subsequent operations, centering and grinding, were completely eliminated in finishing the part, through the use of carbides.

Here, the job was engineered to use Carboloy grade 78B carbide as turning tools, and Carboloy grade 370 carbide for breakdown forming, form taper, finish groove, shave and cutoff.

The work was machined from 1" hex SAE B1112 steel on a 1½", 6-spindle automatic. Tool life for the operations were: 700 pieces per grind for double turning, 700 for butt facing, 500 for breakdown form, 450 for form taper, 400 for form grooving, 800 for shaving, 500 for breakdown and 350 for final cutoff. High speed steel tools were used for spot drilling and for chaser tools since, in this case, both operations are not critical for the job, and work can be done while the other operations are in progress.

In all three of the jobs, coolants played an important role. The engineering team found that by sealing off bearing and spindles of the automatics, water soluble coolants did an effective job of cooling both the machine and cutting tools when machine speeds were increased 10 times.

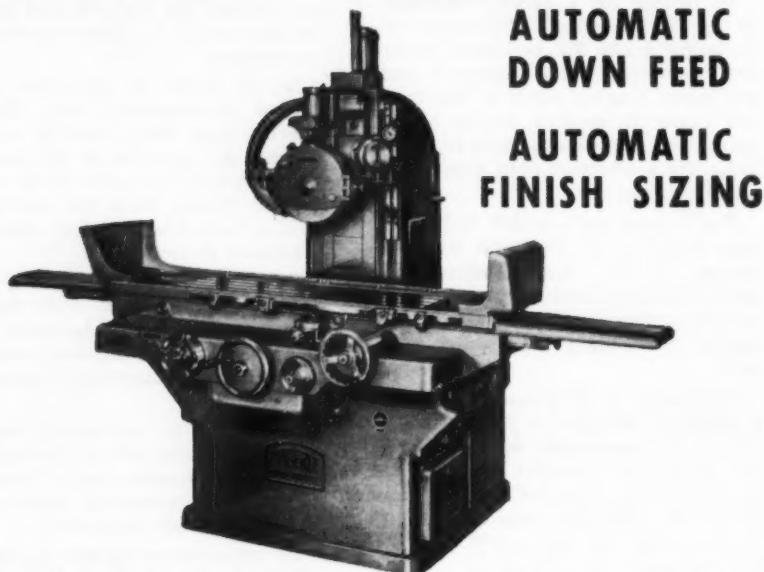
Effectiveness of the cooling method on the machines was such that engineers were able to decrease bearing clearances of the machines, and to adjust slides and carriers to closer tolerances.

The trend to automation and fully automatic equipment to get more production per square foot of floor space has provided extensive opportunity to the multiple bar automatic.

To maintain so great a production advantage, Cone believes that multiple-spindle bar automatic builders must prepare to provide the user with machines with at least as efficient accommodation of carbide tools as is provided by the single spindle machines.

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Report number **40**

Presses . . . part 2

This is the fortieth in a monthly series of special reports discussing various types of machine tools. Included in this month's special report on presses are:

1. Built-in Automation in Dieing Machines.
2. Descriptions of late model presses.
3. Specifications of American-built machines.

Previously published reports discussed: 1. Thread Rolling; 2. Power Press Brakes; 3, 4, 5. Milling Machines; 6. Honing, Lapping, and Superfinishing; 7. Automatic Screw Machines; 8. MAPI Replacement Formula; 9, 10. Chucking Machines, Turret Lathes, Hand Screw Machines; 11. Broaching Machines; 12. Shapers, Slotters, Keyseaters; 13, 14, 15. Lathes; 16. Planers; 17. Gear Making Machines; 18, 19. Boring Machines; 20, 21, 22, 23, 24, 25, 26. Drilling Machines; 27, 28, 29, 30, 31, 32, 33, 34, 35, 36; 37, 38. Grinding Machines; 39. Presses.

Built-in Automation in Dieing Machines

By **W. S. Renier**

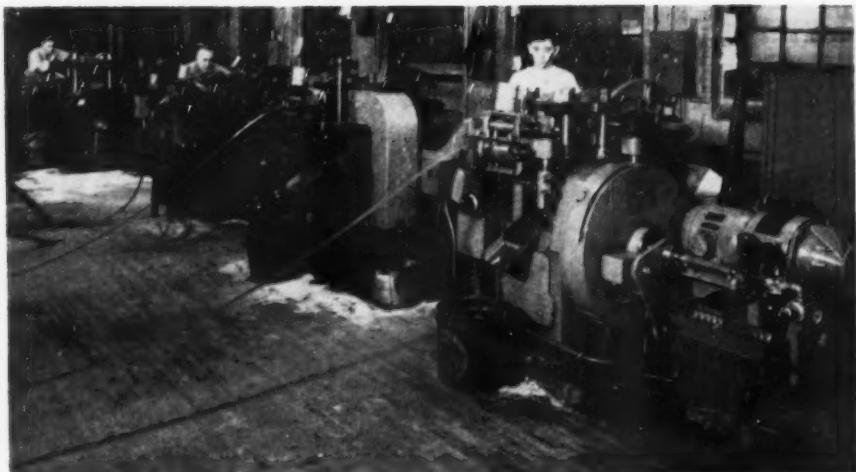
Henry & Wright, Division Emhart Mfg. Co.
Hartford, Conn.

THROUGH the use of progressive dies, dieing machines have virtually eliminated manual handling. They have made it possible to combine complex stamping and forming operations into one progressive production sequence, with the result that one machine can do the work of several conventional presses. While progressive stamping can be achieved with a variety of ordinary power presses, its scope is limited.

Several design features of the dieing

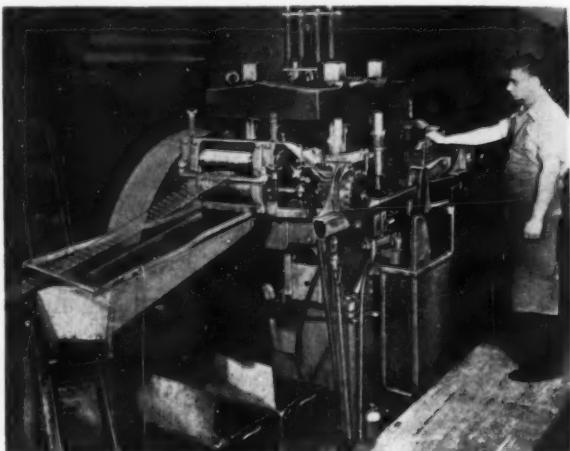
machine have contributed to the more effective use of progressive stamping techniques. A four-post punchholder guide, which provides maximum guiding surface and consequently assures accurate alignment, permits a greater number of stations to be employed.

Again, the machines are designed so that the lower crosshead absorbs the angular thrust of the crankshaft, the upper crosshead taking only the pressure necessary to perform the work in the die. This design feature has greatly increased die life, in some cases as much as 1200%. It has also enabled dieing machines to take eccentric loadings



About 200 different typewriter parts are produced on this battery of dieing machines at Underwood Corp. The range is from simple piercing and blanking to operations produced in multiple station dies, including piercing, lancing, extruding, shaving, forming and blanking with each stroke of the machine.

Fuller Brush Co. uses this 150-ton dieing machine to produce stampings, ring knobs, mop hinge clasps and other metal parts. Flexibility of machine permits designing of die to produce multiple components.

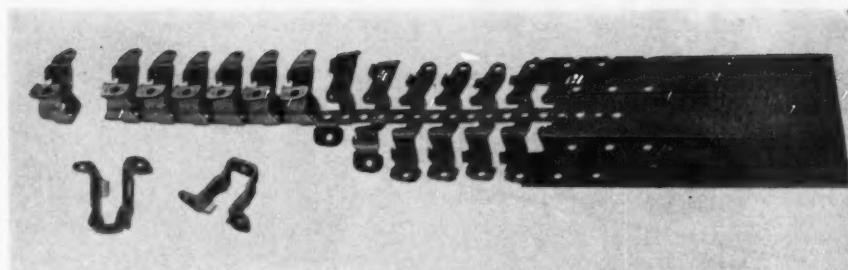


more effectively than other presses. Such loadings are almost inevitable in progressive stamping operations.

Another inherent design feature of the dieing machine is its low center of gravity. Flywheel, crankshaft and connection are all below the die bed. This

permits the machine to operate at high speeds with minimum vibration.

These high speed machines have led to greatly increased production in many installations. Sperry Gyroscope Co., for example, boosted rotor lamination production from 750,000 per month to an



Complete-per-stroke production is a feature of dieing machines. These automotive door hinge brackets are produced on a 250-ton machine, single gear type, at a speed of approximately 45 per minute. Secondary operations are completely eliminated, including coining of countersunk holes.

average of 3,500,000 per month, using dieing machines. This increased output was accompanied by a lowering of costs, greater accuracy and a saving of valuable floor space.

For many companies, a deciding factor in the adoption of the dieing machine is its marked versatility. Underwood Corp., for example, produces about 200 different typewriter parts on its machines. The range is from simple piercing and blanking to stampings produced in multiple station dies including piercing, lancing, extruding, shaving, forming and blanking with each stroke of the machine. Ease of changing dies makes it practical to use dieing machines for short runs in combination with long runs.

Dieing machines frequently combine accurate, high-speed operation, with complete-per-stroke production. Operating at the rate of 450 strokes per minute, one machine produces complete radio tube prongs, while another, heavier machine turns out both halves of a C-clamp frame, at 65 strokes per minute. Bathroom fixtures, hardware items, support brackets and ball bearing retainers are but a few of the products produced in this way.

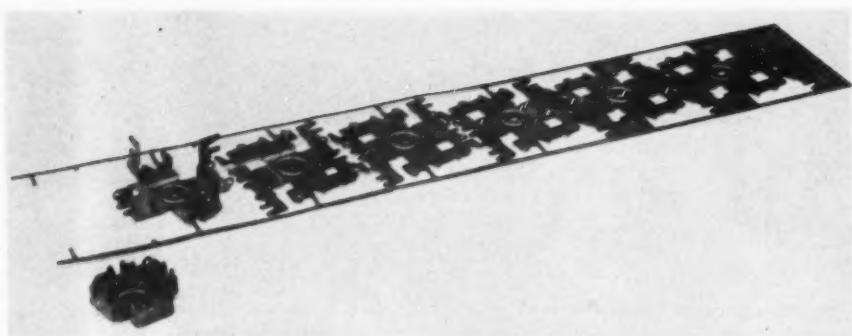
The size of dieing machines currently in operation ranges from machines of a

few tons in weight to those weighing several hundred tons. Built to the same basic design as the smaller models, the large machines have made possible the wider use of heavy-gauge sheet material in metal stamping operations, thereby extending the application of the dieing machine.

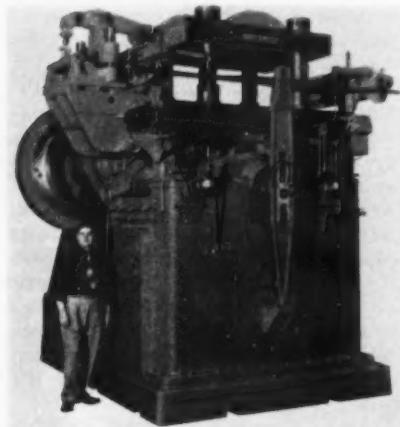
These large machines, equipped with progressive dies, produce stampings with a high degree of accuracy. A 350-ton press, employed by Chrysler Corp., holds the outside diameter and curvature of torus rings to 0.004 in. The sectionalized progressive dies are worked to tolerances of five per cent of the material being stamped.

Chrysler Corp.'s five station machine combines drawing, notching, piercing, flanging and trimming in the progressive die series. Stampings are produced at rates up to 60 pieces per minute.

One of the major problems which designers have had to face has been the production of an automatic feed which would operate satisfactorily with high speed dieing machines. This problem has been solved through the introduction of the large diameter double roll feed, which ensures a greater contacting surface and gives a more positive and accurate feed. Mounted in frames



These crosshead support brackets for an adjustable sewing device are turned out by a dieing machine on a complete-per-stroke production basis at 65 spm.



Heavy dieing machines, such as this 400-ton model, make possible the wider use of medium and heavy-gauge sheet material.

positioned at each side of the machine, the double feed rolls are ground to close limits in order to provide perfect synchronization with the other parts.

A variety of special automatic feeds has been designed to meet feeding requirements which cannot be met by the roll type. Pull Finger feed, for example, is employed when sheet material is

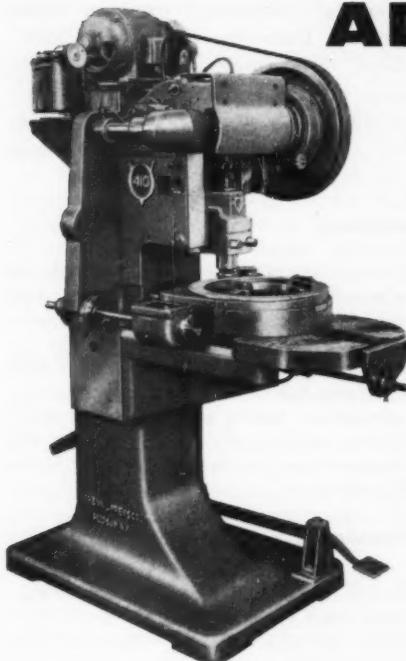
used instead of coil. This attachment operates in synchronism with a roll feed unit, both feeds being motivated by the standard reciprocating drive lever and rack mechanism. This special feed is provided with adjustments to handle a wide range of laminations.

Other special feeds for dieing machines include dial, magazine, hopper, grip and conveyor types. Where necessary, two or more entirely different sets of feeds can be mounted, since all sides of the die bed are machined. In general, automatic feeds have made an important contribution towards the ability of the dieing machine to provide greater automation.

Dieing machines do more than offer progressive stamping. Frequently they serve as complete production units. In many types of press operations, assembly can be included by incorporating an assembly stage in the progressive die or by the addition of special attachments.

Basically, the automatic assembly operation can be divided into three types. Simplest is the assembly in one machine of a part produced in another machine. The second method involves feeding two or more coils through a dieing machine simultaneously with

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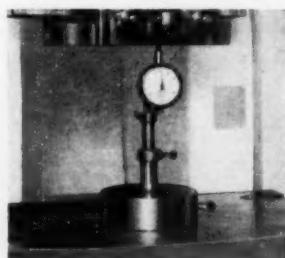
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different parts being produced from each coil in the same progressive die. The parts are assembled before ejection at an assembly station within the die. Third method is to have a stamping produced by the dieing machine joined with a group of parts in a special assembly fixture on the machine before ejection.

Aside from the obvious advantages of lowered production costs, use of the assembly attachment provides other benefits. Since the operation is completed in a single machine, valuable floor space is saved and materials handling costs are drastically reduced.

The End.

Descriptions of late model presses

Warco double crank presses

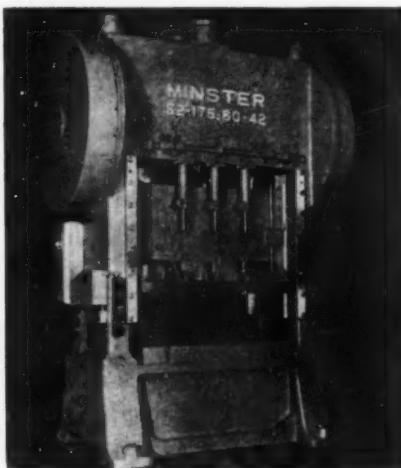
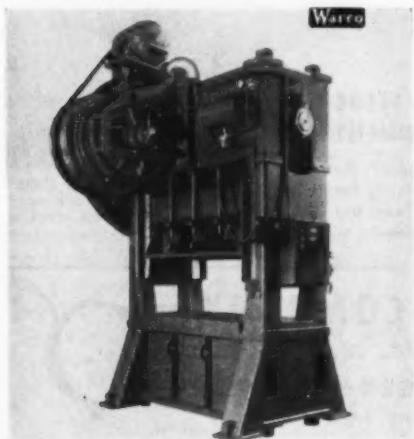
Designed to give maximum performance on all types of blanking, shearing, embossing, shallow drawing and other work involving short to medium length strokes, the complete line of crank presses made by The Federal Machine & Welder Co., Warren, Ohio, includes single and double crank presses, both straight side and gap frame. The use of welded steel plate construction makes it possible to furnish these presses to any die space requirement, as pattern changes are not involved.

Connection is one-piece solid construction. Adjustment is sleeve type incorporating solid one-piece connec-

tion and eliminating ball socket giving better bearing surface, working and stripping loads. The lower end of connection rides in a machined saddle located in a guide in the slide proper and the guide takes the side thrusts of the connection. Such a sleeve type connection is generally found only in the eccentric gear or more elaborate types of presses.

Minster 2-point, straight side

The machine shown is a Minster S2-175-60-42 two point straight side press with a capacity of 175 tons. It is made by The Minster Machine Co., Minster, Ohio.



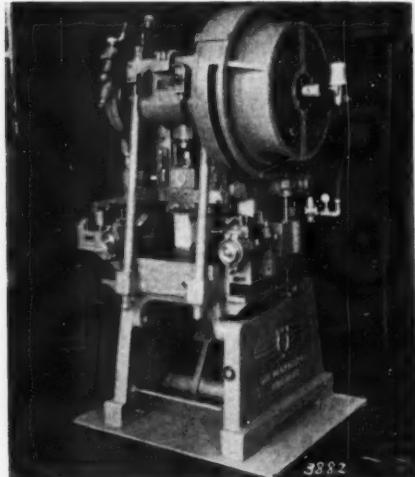
The unit has twin drives, double geared, and is equipped with a Minster air-operated combination friction clutch and brake unit.

Frame is of four piece, steel tie rod construction. Slide has box type construction with motorized barrel type adjustment as standard equipment. Slide adjusting motor, indicating rod and limit switches are furnished and installed by the company. Cross bar knockouts may be added at any time. Counter balance cylinders are standard equipment as are air operated combination friction clutch and brake unit, complete with regulating accessories.

Model 30T V & O OBI press

This Model 30T inclinable open back press, built by the V & O Press Co., Div. Emhart Mfg. Co., Hudson, N.Y., is equipped with Wichita air clutch, variable speed drive, double roll feed, and scrap cutter, and claims longer die life, consistent accuracy, less maintenance.

Construction features include V & O traditional long slide and heavier overall weight combined with machine tool workmanship for rigidity. Presses can



August, 1954

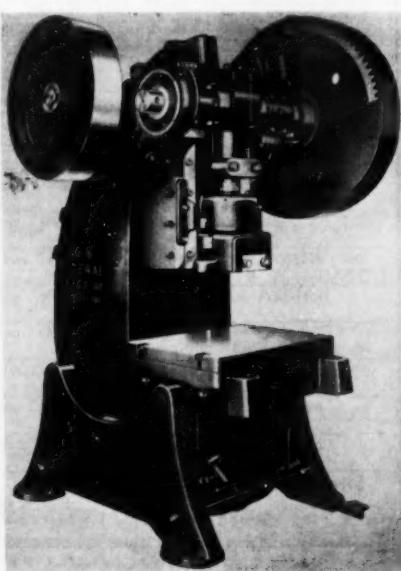
be furnished without feeds for single stroke operation or for continuous operation with V & O automatic high speed double roll feeds, single roll feeds and with or without scrap cutters. Cam release arrangement is provided on roll feeds for a minimum opening of the rolls when used with long pilots. High speed anti-friction mounted shaft with hardened spiral gears runs in oil.

These presses have more bed area, wider and heavier flanged slide, anti-friction bearing mounted web-type flywheel, inclining mechanism operated from in front of press, tie rods with spacing tubes, automatic lubrication, motor drive arrangement including swinging motor bracket, motor sheave, v-flat belts and complete guard.

Four sizes, 25, 30, 35 and 45 tons, are available.

No. 6 geared type OBI Federal

Federal standard presses are designed to handle a wide range of operations. A safe, front-operated mechanism enables a single workman to recline

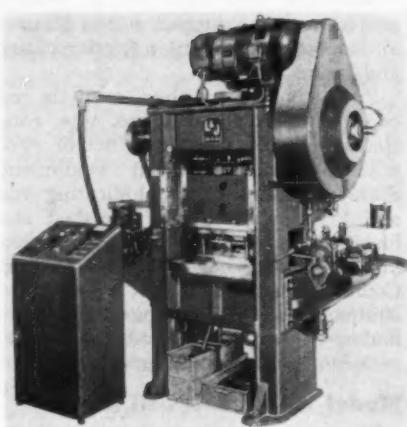


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the standard press easily, quickly, securely to a desired position. The open-back feature provides easy accessibility from front or back for removal of finished work. Non-repeat clutch mechanism—an exclusive Federal safety feature—is positive assurance against repeating of the press and accidents, should the crank pass the center of the operating cycle; offered in sizes 1 to 7 (6 to 80 tons)—in both geared and flywheel types, in standard, dial feed, high speed and specials. Shown is the No. 6 geared type, capacity 65 tons. It is also available in the flywheel type. The Federal Press Co., Elkhart, Ind.

L & J double crank, straight side, high speed press

These high speed, double crank type, 20-ton and 30-ton capacity versatile presses are for high speed production of small precision parts in large volume.



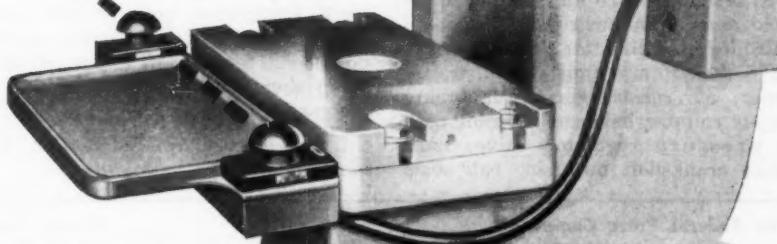
They are said to combine faster production, greater accuracy, permit use of larger or progressive dies, be adaptable to many jobs. Features include up to

L & J Press Corporation

Elkhart, Ind.

Type and Model	Capacity	Dia. Crankshaft at Main Bearing and at Crank Pin	A=Area Bolster Plate O=Opening	SH=Shut Height ST=Stroke, Std. & Max.
O.B.I.				
No. 0	6	1 1/8" and 2 1/8"	A=10" x 6" O=5" x 3"	SH=5 1/2" ST=1" and 3"
No. 1	14	2" and 2 1/4"	A=15 1/2" x 8" O=7" x 5"	SH=7 1/4" ST=1 1/2" and 3"
No. 2	18	2 1/4" and 2 1/2"	A=18" x 11 1/2" O=7" x 5"	SH=7 1/4" ST=2" and 3 1/2"
No. 3	22	2 1/2" and 2 1/2"	A=21 1/2" x 13" O=10" x 5"	SH=8 1/4" ST=2 1/2" and 4"
No. 3 1/2	27	2 1/2" and 3"	A=21 1/2" x 13" O=10" x 5"	SH=8 1/4" ST=2 1/2" and 4"
No. 4	36	3 1/8" and 3 1/8"	A=26 1/2" x 15" O=13" x 7"	SH=9" ST=3" and 5"
No. 4 1/2	43	3 1/8" and 4"	A=28" x 18" O=15" x 10"	SH=10%" ST=3" and 5"
No. 45	43	3 1/8" and 4"	A=36" x 24" O=18" x 12"	SH=10" ST=3" and 6"
No. 5	50	3 1/8" and 4 1/4"	A=30" x 18 1/2" O=14 1/2" x 8"	SH=10%" ST=4" and 6"
No. 6	65	4 1/8" and 5"	A=36" x 26" O=18" x 14"	SH=13" ST=4" and 7"
No. 7	80	4 1/8" and 5 1/8"	A=38" x 24" O=19 1/2" x 14"	SH=15%" ST=4" and 8"
Straight Side				
20-2-24	20	150-450 strokes per minute	A=24" x 19" A (Ram Area)= 24" x 12"	SH=11" ST=1" and 2"
30-2-24	30	do	do	do

INCREASE PRODUCTION WITH **SAFETY!**



A NEW ATTACHMENT FOR PRESSES WITH MECHANICAL CLUTCHES

We offer a dual push-button solenoid operated trip attachment that will help increase production. Relieves fatigue with its ease of operation. Two hands must be on the controls when press is tripped. Both buttons must be pushed to trip the press, and both buttons must be released to again trip the press. This prevents an operator from beating the safety attachment by use of rubber bands, sticks, elbows or other means. A reset mechanism is actuated by back contacts of push buttons, requiring definite use of two hands by the operator.

Trip attachments give you these features:

- Dual mushroom type push buttons with reset contacts
- 110 volt solenoid housed in aluminum box
- Red warning light
- Reset relay and micro-switch
- Wiring and cord set for plugging into standard electrical outlet
- Adjustable connecting links. Foot switch also available.

Junior Package Unit, less table \$94.50

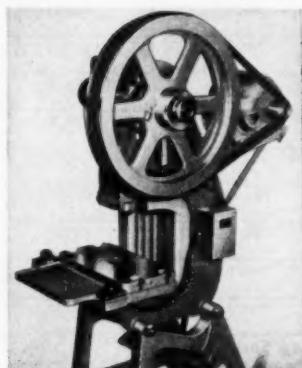
 Complete with table \$114.50

For larger presses up to 20 ton capacity
such as the Perkins No. 351B.

 Unit less table \$125.00

 Complete with table \$145.00

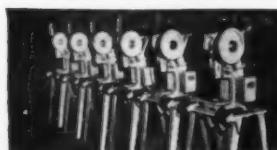
Units available for heavier presses.



**PERKINS No. 351B STANDARD
INCLINABLE PRESS**

20 ton capacity press equipped with
electric solenoid safety trip attach-
ment and work table, complete with
motor and control.

f.o.b. Warren, Mass. \$1345.00



Junior Presses with dual push
button electric solenoid safety trips.

Perkins Machine Co. Warren, Mass.

PRESS BUILDERS FOR OVER 50 YEARS

450 strokes per minute, large ram and bolster areas, box-type rigid welded steel frame, auxiliary equipment to suit the job.

Standard equipment includes: Fawick air clutch; rotor seal unit with connections; selector switch for inching, single stroke and continuous running; solenoid controlled air valve; air pressure regulator valve; rotary limit switch; transformer; air release spring-set brake; two air counter balances for ram with air pressure regulator valve; hard bronze crankshaft bushings, ball seats

and gib; automatic lubrication to five crankshaft bearings, eight surfaces on four square type gibs and two ball seats (15 outlets); v-belts, sheave, belt guard and motor bracket.

Optional equipment includes: Electrical equipment and variable speed drive with controls; control cabinet; double roll feed; by-pass type roll lifter; scrap shear; stock oiler; provision for automatic safety stop.

L & J Press Corp., 822 Ren St., Elkhart, Ind.

The Federal Press Company

Elkhart, Ind.

Type and Model	S=Shank Dia. of Blank SL=Shank Length, Max. & Min. C=Capacity (Tons)	Dia. Crankshaft at Main Bearing and Pin	A=Area of Bed O=Opening in Bed	SH=Shut Height ST=Stroke, Std. & Max.
O.B.I.				
No. 1	C=14	2 $\frac{1}{8}$ " and 2 $\frac{5}{8}$ "	A=15" \times 8" O=4" \times 6"	SH=7 $\frac{1}{2}$ " ST=1 $\frac{1}{2}$ " and 3"
No. 2	C=18	2 $\frac{1}{8}$ " and 2 $\frac{5}{8}$ "	A=17 $\frac{1}{2}$ " \times 10" O=5" \times 7"	SH=7 $\frac{1}{2}$ " ST=2 $\frac{1}{2}$ " and 3 $\frac{1}{2}$ "
No. 3	C=26	2 $\frac{3}{4}$ " and 3"	A=21 $\frac{1}{2}$ " \times 12 $\frac{3}{4}$ " O=5" \times 11"	SH=8 $\frac{1}{4}$ " ST=2 $\frac{1}{2}$ " and 4"
No. 33	C=26	2 $\frac{3}{4}$ " and 3"	A=32" \times 16" O=21" \times 6"	SH=9 $\frac{1}{2}$ " ST=2 $\frac{1}{2}$ " and 4"
No. 4	C=37	3 $\frac{1}{4}$ " and 3 $\frac{3}{4}$ "	A=27" \times 14 $\frac{1}{4}$ " O=7" \times 12"	SH=9 $\frac{1}{4}$ " ST=3" and 5"
No. 44	C=35	3 $\frac{1}{4}$ " and 3 $\frac{3}{4}$ "	A=33" \times 21" O=21" \times 7"	SH=10" ST=6" and 10"
No. 5	C=50	3 $\frac{3}{4}$ " and 4 $\frac{1}{4}$ "	A=29 $\frac{1}{2}$ " \times 18 $\frac{1}{2}$ " O=8" \times 14 $\frac{1}{2}$ "	SH=10 $\frac{1}{4}$ " ST=4" and 6"
No. 6	C=65	4 $\frac{1}{8}$ " and 4 $\frac{5}{8}$ "	A=33" \times 25 $\frac{1}{2}$ " O=14" \times 18"	SH=13" ST=4" and 6"
No. 7	C=80	4 $\frac{5}{8}$ " and 5 $\frac{1}{4}$ "	A=35" \times 28" O=14" \times 18"	SH=13 $\frac{1}{2}$ " ST=4" and 7"
Cap Screw Bolt Trimming and Extruding				
3	S= $\frac{1}{4}$ " to $\frac{3}{8}$ " SL=3 $\frac{1}{2}$ " and 1 $\frac{1}{4}$ " C=26	2 $\frac{3}{4}$ " and 3"	O (Round Hole for upper and lower die)= 1 $\frac{1}{8}$ " and 1 $\frac{1}{8}$ "	ST=4"
4	S= $\frac{1}{4}$ " to $\frac{3}{8}$ " SL=4" and 1 $\frac{1}{4}$ " C=37	3 $\frac{1}{4}$ " and 3 $\frac{3}{4}$ "	O=1 $\frac{1}{8}$ " and 1 $\frac{1}{8}$ "	ST=4 $\frac{1}{2}$ "
5	S= $\frac{1}{4}$ " to $\frac{3}{8}$ " SL=6" and 1 $\frac{1}{2}$ " C=50	3 $\frac{3}{4}$ " and 4 $\frac{1}{4}$ "	O=1 $\frac{1}{8}$ " and 1 $\frac{1}{8}$ "	ST=7"
6	S= $\frac{1}{8}$ " to $\frac{3}{8}$ " SL=6" and 1 $\frac{1}{2}$ " C=65	4 $\frac{1}{8}$ " and 4 $\frac{5}{8}$ "	O=1 $\frac{1}{8}$ " and 1 $\frac{1}{8}$ "	ST=7"
Dial Feed Presses	Company makes line of Dial Feed Presses, 6.6 tons to 80 tons, in 7 models. Dia. of dial tables are: 14 $\frac{1}{2}$ ", 18", 18 $\frac{1}{2}$ ", 23 $\frac{1}{2}$ ", 23 $\frac{3}{4}$ ", 26", 30", 30 $\frac{1}{2}$ ". Shut height: 3 $\frac{1}{4}$ ", 4 $\frac{1}{8}$ ", 4 $\frac{5}{8}$ ", 4 $\frac{3}{4}$ ", 5 $\frac{1}{4}$ ", 6", 8 $\frac{1}{4}$ ", 8 $\frac{3}{4}$ ".			

The V & O Press Co., Div. of Emhart Mfg. Co.

Hudson, N. Y.

Type and Model	Rating (Tons)	Dia. of Shaft at Bearings and Eccentric	A=Area of Bed O=Opening in Bed	SH=Shut Height ST=Stroke, Std. & Max.
O.B.I.				
00	3	1 $\frac{1}{4}$ " and 2 $\frac{1}{2}$ "	A=6 $\frac{1}{2}$ "x11" O=—	SH=6 $\frac{1}{2}$ "; ST=1" and 1 $\frac{1}{4}$ "
01S	5	1 $\frac{1}{2}$ " and 3 $\frac{1}{2}$ "	A=10"x13" O=—	SH=8"; ST=1 $\frac{1}{2}$ " and 3"
0	8	1 $\frac{1}{2}$ " and 2 $\frac{1}{2}$ "	A=8 $\frac{1}{2}$ "x12 $\frac{1}{4}$ " O=3 $\frac{1}{4}$ "x5"	SH=6 $\frac{1}{2}$ "; ST=1 $\frac{1}{4}$ " and 2 $\frac{1}{2}$ "
01	11	1 $\frac{1}{2}$ " and 3 $\frac{1}{2}$ "	A=8 $\frac{1}{2}$ "x13" O=4 $\frac{1}{2}$ "x6"	SH=6 $\frac{1}{2}$ "; ST=1 $\frac{1}{2}$ " and 3"
01W	11	1 $\frac{1}{2}$ " and 3 $\frac{1}{2}$ "	A=8 $\frac{1}{2}$ "x15 $\frac{1}{2}$ " O=4 $\frac{1}{2}$ "x8 $\frac{1}{2}$ "	SH=6 $\frac{1}{2}$ "; ST=1 $\frac{1}{2}$ " and 3"
1	14	2" and 3 $\frac{1}{2}$ "	A=10"x14" O=5 $\frac{1}{2}$ "x7"	SH=7"; ST=1 $\frac{1}{2}$ " and 3"
1W	14	2" and 3 $\frac{1}{2}$ "	A=10"x17 $\frac{1}{2}$ " O=5 $\frac{1}{2}$ "x10 $\frac{1}{2}$ "	SH=7"; ST=1 $\frac{1}{2}$ " and 3"
1 $\frac{1}{2}$	18	2 $\frac{1}{2}$ " and 3 $\frac{1}{2}$ "	A=9 $\frac{1}{2}$ "x16" O=5 $\frac{1}{2}$ "x8 $\frac{1}{2}$ "	SH=7"; ST=2" and 3 $\frac{1}{2}$ "
2	22	2 $\frac{1}{2}$ " and 4 $\frac{1}{2}$ "	A=12 $\frac{1}{2}$ "x17 $\frac{1}{2}$ " O=6 $\frac{1}{2}$ "x8 $\frac{1}{2}$ "	SH=9"; ST=2" and 4 $\frac{1}{2}$ "
2W	22	2 $\frac{1}{2}$ " and 4 $\frac{1}{2}$ "	A=12 $\frac{1}{2}$ "x21 $\frac{1}{2}$ " O=6 $\frac{1}{2}$ "x12 $\frac{1}{2}$ "	SH=9"; ST=2" and 4 $\frac{1}{2}$ "
2 $\frac{1}{2}$	27	2 $\frac{1}{2}$ " and 4 $\frac{1}{2}$ "	A=14 $\frac{1}{2}$ "x20 $\frac{1}{2}$ " O=7"x10"	SH=9 $\frac{1}{2}$ "; ST=2" and 5"
2 $\frac{1}{2}$ W	27	2 $\frac{1}{2}$ " and 4 $\frac{1}{2}$ "	A=14 $\frac{1}{2}$ "x24" O=7"x13 $\frac{1}{2}$ "	SH=9 $\frac{1}{2}$ "; ST=2" and 5"
3	32	3" and 5 $\frac{1}{2}$ "	A=15 $\frac{1}{2}$ "x21 $\frac{1}{2}$ " O=8"x11 $\frac{1}{2}$ "	SH=8 $\frac{1}{2}$ "; ST=3" and 5"
3W	32	3" and 5 $\frac{1}{2}$ "	A=15 $\frac{1}{2}$ "x26 $\frac{1}{2}$ " O=8"x16 $\frac{1}{2}$ "	SH=8 $\frac{1}{2}$ "; ST=3" and 5"
3 $\frac{1}{2}$	37	3 $\frac{1}{2}$ " and 5 $\frac{1}{2}$ "	A=17 $\frac{1}{2}$ "x25" O=10"x13 $\frac{1}{2}$ "	SH=10"; ST=3" and 5"
4	43	3 $\frac{1}{2}$ " and 5 $\frac{1}{2}$ "	A=20 $\frac{1}{2}$ "x27 $\frac{1}{2}$ " O=10 $\frac{1}{2}$ "x15"	SH=11"; ST=3" and 5"
4W	43	3 $\frac{1}{2}$ " and 5 $\frac{1}{2}$ "	A=20 $\frac{1}{2}$ "x33" O=10 $\frac{1}{2}$ "x20 $\frac{1}{2}$ "	SH=11"; ST=3" and 5"
50S	50	3 $\frac{1}{2}$ " and 5"	A=23"x32" O=12 $\frac{1}{2}$ "x18 $\frac{1}{2}$ "	SH=12"; ST=3" and 6"
5	56	4" and 6 $\frac{1}{2}$ "	A=23 $\frac{1}{2}$ "x32" O=12 $\frac{1}{2}$ "x18 $\frac{1}{2}$ "	SH=14"; ST=3" and 6"
5W	56	4" and 6 $\frac{1}{2}$ "	A=23 $\frac{1}{2}$ "x37" O=12 $\frac{1}{2}$ "x23 $\frac{1}{2}$ "	SH=14"; ST=3" and 6"
5 $\frac{1}{2}$	71	4 $\frac{1}{2}$ " and 7 $\frac{1}{2}$ "	A=26 $\frac{1}{2}$ "x36" O=14 $\frac{1}{2}$ "x20"	SH=15"; ST=4" and 7"
6	88	5" and 7 $\frac{1}{2}$ "	A=28"x39" O=15"x21"	SH=16"; ST=4" and 8"
Non-Inclinable				
105S	105	5 $\frac{1}{2}$ " and 7 $\frac{1}{2}$ "	A=32"x44 $\frac{1}{2}$ " O=18"x24"	SH=18"; ST=6" and 8"
T-Line O.B.I.				
25T	25	2 $\frac{1}{2}$ " and 4 $\frac{1}{2}$ "	A=14"x24" O=6"x11"	SH=9 $\frac{1}{2}$ "; ST=1" and 5"
30T	30	3" and 5 $\frac{1}{2}$ "	A=15 $\frac{1}{2}$ "x26" O=7"x12"	SH=10"; ST=1" and 5"
35T	35	3 $\frac{1}{2}$ " and 5 $\frac{1}{2}$ "	A=17 $\frac{1}{2}$ "x29" O=8"x13 $\frac{1}{2}$ "	SH=10 $\frac{1}{2}$ "; ST=1" and 5"
45T	45	3 $\frac{1}{2}$ " and 6 $\frac{1}{2}$ "	A=20 $\frac{1}{2}$ "x34 $\frac{1}{2}$ " O=10 $\frac{1}{2}$ "x15"	SH=11"; ST=1" and 6"

The Minster Machine Company

Minster, Ohio

Type and Model	Capacity	Dia. Crankshaft at Main Bearing and Pin	A=Area Top of Bolster O=Opening in Bed W=Width of Opening in Back	SH=Shut Height ST=Stroke, S:d. & Max.
Open Back Gap				
20-3½	45	3½"-5½"	A=18"x28" O=12"x16" W=13½"	SH=8½" ST=3" and 6"
20-4	60	4"-6"	A=21"x32" W=15"	SH=10½" ST=4" and 7"
20-4½	75	4½"-6¾"	A=22"x35" W=18"	SH=11½" ST=4" and 7"
20-5	95	5"-7½"	A=26"x40" W=21"	SH=14" ST=4" and 8"
20-5½	113	5½"-8¼"	A=28"x45" W=24"	SH=16" ST=5" and 9"
20S-6½	150	6½"-9¾"	A=34"x54" O=12"x16" W=26"	SH=16" ST=6" and 13"
Deep Throat Punching				
20-1	15	2½"	A=10"x17" O=6"x8" D=30" (Dist. back from Center of Slide)	SH=6½" ST=1½" and 2½"
20-2	25	3½"	A=12"x20" O=6"x8" D=30"	SH=7½" ST=1½" and 3"
20-3	30	4"	A=14"x22" O=6"x8" D=30"	S:d=8" ST=1½" and 4"
Single Crank Straight Side				
S1- 50-21-24	50	4"-6"	A=24"x21" O=14½"x14½"	SH=9" ST=4" and 8"
S1- 75-21-24	75	4½"-6¾"	do	SH=10" ST=4" and 9"
S1-100-24-30	100	5"-7½"	A=30"x24" O=19"x19"	SH=11" ST=5" and 10"
S1-125-24-30	125	5½"-8¼"	do	SH=12" ST=5" and 11"
S1-150-27-33	150	6"-9"	A=33"x27" O=21"x21"	SH=13" ST=6" and 12"
S1-175-27-33	175	6½"-9½"	do	SH=15" ST=6" and 13"
S1-200-30-36	200	7"-10½"	A=36"x30" O=23"x23"	SH=16" ST=7" and 14"
S1-250-30-36	250	7½"-11½"	A=36"x30" O=25"x25"	SH=17" ST=7" and 15"
S1-300-36-42	300	8½"-12¾"	A=42"x36" O=27½"x27½"	SH=18" ST=8" and 16"
S1-400-36-48	400	9½"-14½"	A=48"x36" O=29½"x29½"	SH=20" ST=9" and 18"
S1-500-42-54	500	10½"-15¾"	A=54"x42" O=32"x32"	SH=22" ST=10" and 20"
S1-600-42-54	600	11½"-17½"	A=54"x42" O=34"x34"	SH=24" ST=11" and 22"

WHY IT PAYS TO BUY MECHANICAL TUBING FROM US



You can reduce storage space, increase productive area

- There's no need of sacrificing large areas of valuable floor space for tubing storage when those areas could easily be made productive. Why not let us carry the storage and handling costs?

Our warehouses stock an exceptionally large variety of tubing products . . . 531 sizes of Shelby Seamless Mechanical Tubing are readily available! So you can always count on quick delivery of exactly the type and size tubing you need . . . whether your order is by the inch or by the carload. And all our tubing products are made by the world's leading manufacturer of fine tubing and pipe—National Tube Division of U. S. Steel.

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Contact our nearest warehouse when you need quality tubing of any sort and in any quantity: mechanical tubing, round and square, seamless and welded; boiler tubing, pressure tubing and pipe; and stainless steel tubing and pipe, seamless and welded.

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When you want it
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Warehouses and Sales Offices Coast to Coast

UNITED STATES STEEL

The Minster Machine Company

Minster, Ohio

Type and Model	Capacity	Dia. Crankshaft at Main Bearing and Pin	A=Area Top of Bolster O=Opening in Bed W=Width of Opening in Back	SH=Shut Height ST=Stroke, Std. & Max.
Knuckle Joint Embossing				
90- 150	150 D=Distance Between Uprights to Clear, 15"	3½"-5½"	A=20"x15" O=2"	SH=7" ST=1½" and 3½"
90- 250	250; D=18"	4"-6"	A=24"x18" O=2½"	SH=8" ST=1½" and 4"
90- 400	400; D=20"	5"-7½"	A=28"x21" O=2½"	SH=9" ST=1½" and 5"
90- 600	600; D=24"	6"-9"	A=32"x24" O=3"	SH=10" ST=2" and 6"
90- 800	800; D=28"	7"-10½"	A=36"x28" O=3"	SH=11" ST=2" and 7"
90-1000	1000; D=32"	8"-12"	A=41"x32" O=4"	SH=12" ST=2" and 8"
90-1200	1200; D=38"	9"-13½"	A=46"x38" O=4"	SH=14" ST=3" and 9"
90-1500	1500; D=44"	10"-15"	A=51"x44" O=4"	SH=16" ST=3" and 10"
Double Crank Straight Side				
S2- 50	50; D=Width of Press, 36", 48", 60", 72", 84"	4"-6"	No. of Strokes Per Min. 90 and 45	SH=12" ST=4" and 8"
S2- 75	75; D=36", 48", 60", 72", 84"	4½"-6¾"	90 and 40	SH=15" ST=4" and 9"
S2-100	100; D=36", 48", 60", 72", 84"	5"-7½"	90 and 37	SH=15" ST=5" and 10"
S2-125	125; D=48", 60", 72", 84", 96"	5½"-8¼"	37 and 26-20	SH=17" ST=5" and 11"
S2-150	150; D=48", 60", 72", 84", 96"	6"-9"	33 and 25-18	SH=17" ST=6" and 12"
S2-175	175; D=60", 72", 84", 96", 108"	6½"-9¾"	30 and 22-17	SH=21" ST=6" and 13"
S2-200	200; D=60", 72", 84", 96", 108"	7"-10½"	30 and 20-15½	SH=21" ST=7" and 14"
S2-250	250; D=60", 72", 84", 96", 108"	7½"-11½"	28 and 18-14½	SH=22½" ST=7" and 15"
S2-300	300; D=60", 72", 84", 96", 108"	8"-12"	28 and 18-14½	SH=23" ST=8" and 16"
S2-400	400; D=72", 84", 96", 108", 120"	9"-13½"	15½-12½	SH=26" ST=9" and 18"
S2-500	500; D=72", 84", 96", 108", 120"	10"-15"	14½-11½	SH=28" ST=10" and 20"
S2-600	600; D=84", 96", 108", 120", 132"	11"-16½"	12½-10½	SH=30" ST=11" and 21"
Piece-Maker" Series				
P2- 20	20 D=24", 30", 32", 36"	2½"-3½"	200-400	SH=6" ST=1" and 2"
P2- 30	30 D=24", 30", 32", 36"	3"-4"	200-400	SH=8" ST=1" and 2"
P2- 45	45 D=32", 36", 42", 48"	3½"-5"	100-200	SH=11" ST=1½" and 3½"
P2- 60	60 D=32", 36", 42", 48"	4"-5½"	100-200	SH=13" ST=1½" and 3½"
P2- 75	75 D=36", 42", 48", 54"	4½"-6¾"	80-160	SH=13" ST=2" and 3½"
P2-100	100 D=36", 42", 48", 54"	5"-7"	80-160	SH=13" ST=2" and 3½"
P2-150	150 D=42", 48", 54", 60"	6½"-9"	75-150	SH=15" ST=2½" and 4"

The Minster Machine Co.

Minster, Ohio

Type and Model	Ratings (Tons)	Dia. Crankshaft at Main Bearing and Pin	A=Area Top of Bolster O=Opening in Bed	SH=Shut Height ST=Stroke, Std. & Max.
O.B.I.				
No. 1	12	2"-3"	A=9"x16" O=5"x8"	SH=6½" ST=1½" and 3"
No. 2	16	2½"-3¾"	A=10"x17" O=6"x9½"	SH=6½" ST=2" and 3½"
No. 3	22	2½"-3¾"	A=12"x20" O=7½"x11"	SH=7" ST=2½" and 4"
No. 4	32	3"-4½"	A=14"x22" O=9"x12"	SH=7½" ST=3" and 5"
No. 5	45	3½"-5½"	A=18"x28" O=12"x16"	SH=8½" ST=3" and 6"
No. 6	60	4"-6"	A=21"x32" O=14"x18"	SH=10½" ST=4" and 7"
No. 7	75	4½"-6¾"	A=22"x35" O=14"x20"	SH=11½" ST=4" and 7"
No. 8	95	5"-7½"	A=26"x40" O=16"x24"	SH=14" ST=4" and 8"
No. 9	113	5½"-8½"	A=28"x45" O=18"x28"	SH=16" ST=5" and 9"
Adjustable Bed Horning Presses				
			AS=Area of Slide AB=Area Top of Bolster	S=Dist. Slide to Center of Horn Stroke ST=Stroke, Std. & Max.
10-1	12	2"-3"	AS=5½"x4½" AB=9"x16"	S=5" ST=1½" and 3"
10-2	16	2½"-3¾"	AS=6½"x5½" AB=10"x17"	S=5½" ST=2 and 3½"
10-3	22	2½"-3¾"	AS=7¾"x6" AB=14"x20"	S=6" ST=2½" and 4"
10-4	32	3"-4½"	AS=8½"x7" AB=18"x24"	S=7" ST=3" and 5"
10-5	45	3½"-5½"	AS=10"x8" AB=20"x28"	S=8" ST=3" and 6"
10-6	60	4"-6"	AS=11"x9" AB=22"x32"	S=10" ST=4" and 7"
10-6A	60	4"-6"	AS=11"x9" AB=32"x32"	S=10" ST=4" and 8"
10-7	75	4½"-6¾"	AS=13¾"x13½" AB=24"x36"	S=12" ST=4" and 9"
10-8	95	5"-7½"	AS=15"x16½" AB=26"x40"	S=14" ST=4" and 9"

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making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

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THE DYKEM COMPANY
2301G North 11th St. • St. Louis 6, Mo.

The Federal Machine and Welder Co.

Warren, Ohio

Model and Type	Capacity	A=Area of Bolts or O=Opening in bed B=Between Uprights to Clear	No. of Strokes	SH=Shut Height ST=Stroke, S.d. & Max.
O.B.I.				
No. 40	40	A=14"x25" O=9"x12"	55 or 90 to 120	SH=10" ST=3"
No. 60	60	A=19"x26" O=12"x19"	55 or 90 to 120	SH=12" ST=4" and 6"
No. 75	75	A=23"x32" O=14"x18"	55 or 90 to 120	SH=14" ST=5" and 8"
No. 100	100	A=30"x38 1/2" O=19"x22"	35	SH=17" ST=6" and 10"
No. 150	150	A=33"x50" O=20 1/2"x24"	30	SH=21" ST=8" and 12"
No. 200	200	A=34"x52" O=26"x26"	30	SH=23" ST=10" and 14"
Straight-Side Double Crank				
60-2-C	60	B=32", 36", 42", 48", 54", 60", 72", 84"	45	SH=13" ST=4"
75-2-C	75	B=36", 42", 48", 54", 60", 72", 84", 96"	45	SH=14" ST=5"
100-2-C	100	B=35", 42", 50", 54", 60", 72", 84", 96"	35	SH=18" ST=8"
125-2-C	125	B=48", 54", 60", 72", 84", 96", 108", 120"	35	SH=18" ST=8"
150-2-C	150	B=48", 54", 60", 72", 84", 96", 108", 120"	30	SH=20" ST=10"
200-2-C	200	B=44", 60", 72", 84", 96", 108", 120"	30	SH=20" ST=10"
250-2-C	250	B=60", 66", 72", 84", 96", 108", 120"	30	SH=22" ST=10"
300-2-C	300	B=60", 66", 72", 84", 96", 108", 120"	30	SH=24" ST=10"
350-2-C	350	B=66", 72", 84", 96", 108", 120"	30	SH=26" ST=12"
400-2-C	400	B=66", 72", 84", 96", 108", 120"	30	SH=28" ST=12"
Double Crank Gap — Single Geared				
100-2-CG	100	B=44", 54", 60", 72", 84"	35	SH=18" ST=8" and 11"
150-2-CG	150	B=48", 54", 60", 72", 84"	30	SH=20" ST=10" and 12"
200-2-CG	200	B=54", 60", 72", 84", 96"	30	SH=20" ST=10" and 14"
250-2-CG	250	B=60", 72", 84", 96"	30	SH=22" ST=10" and 14"
300-2-CG	300	B=60", 72", 84", 96"	30	SH=24" ST=10" and 16"
400-2-CG	400	B=72", 84"	30	SH=26" ST=12" and 18"
500-2-CG	500	B=72", 84"	30	SH=28" ST=12" and 20"

The Federal Machine and Welder Co.

Warren, Ohio

Type and Model	Capacity	A=Area of Bolster O=Opening in Bed B=Between Uprights to Clear	No. of Strokes	SH=Shut Height ST=Stroke, Std. & Max.
Eccentric Gear—Two Point				
100-2	100	B=42", 48", 54", 60", 72", 84", 96", 108"	20-30	SH=18" ST=8" and 14"
150-2	150	B=48", 54", 60", 72", 84", 96", 108", 120"	20-30	SH=20" ST=8" and 16"
200-2	200	B=48", 54", 60", 72", 84", 96", 108", 120"	24-18	SH=22" ST=10" and 18"
250-2	250	B=48", 54", 60", 72", 84", 96", 108", 120"	24-18	SH=24" ST=10" and 18"
300-2	300	B=60", 72", 84", 96", 108", 120", 132", 144"	20-14	SH=24" ST=12" and 18"
400-2	400	B=72", 84", 96", 108", 120", 132", 144", 156"	15-12	SH=30" ST=16" and 20"
500-2	500	B=84", 96", 108", 120", 132", 144", 156", 168"	15-12	SH=30" ST=16" and 20"
600-2	600	B=84", 96", 108", 120", 132", 144", 156", 168"	15-12	SH=30" ST=16" and 20"
800-2	800	B=96", 108", 120", 132", 144", 156", 168", 180"	14-12	SH=32" ST=18" and 22"
1000-2	1000	B=96", 108", 120", 132", 144", 156", 168", 180"	14-12	SH=34" ST=18" and 22"
1200-2	1200	B=96", 108", 120", 132", 144", 156", 168", 180"	14-12	SH=36" ST=18" and 22"
1500-2	1500	B=96", 108", 120", 132", 144", 156", 168", 180"	8-12	SH=36" ST=18" and 24"

BLUE VALLEY FLANGING MACHINES

No. 1 10 gauge capacity combination circle shear and flanger; from 14" to 6' diameter flat with support; 12' diameter less support.

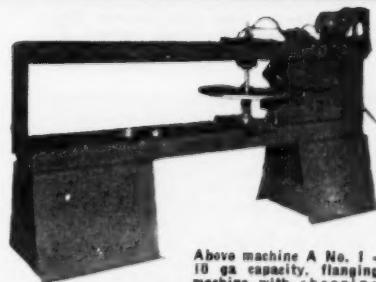
No. 5 $\frac{1}{2}$ " capacity flanging flat heads 24" to 20"; also handles dished heads up to 12' dia.

No. 3 $\frac{3}{4}$ " capacity flanging flat heads from 18" to 12'.

No. 6 $\frac{3}{4}$ " capacity for flanging flat heads 28" to 20"; also handles dished heads up to 12' dia.

No. 4 $\frac{5}{8}$ " capacity flanging flat heads 20" to 12'; also handles standard dished heads up to 12' dia.

No. 53 Elliptical Head Shear and Flanging Machine which operates from the same controls. Head is sheared to size and shape before flanging from same template without removing work from the machine.



Above machine A No. 1 - 10 ga capacity, flanging machine with shearing attachments for shearing and flanging flat heads from 14" to 6 ft. dia. as shown. Will handle up to 12 ft. diameter by removing the angles at end of machine.

BLUE VALLEY MACHINE & MFG. CO.
6832 Truman Road KANSAS CITY 26, MO.

SANFORD

SURFACE GRINDER
MODEL MG

For Dry or Wet* Grinding!
PRECISION • SPEED • SENSITIVITY

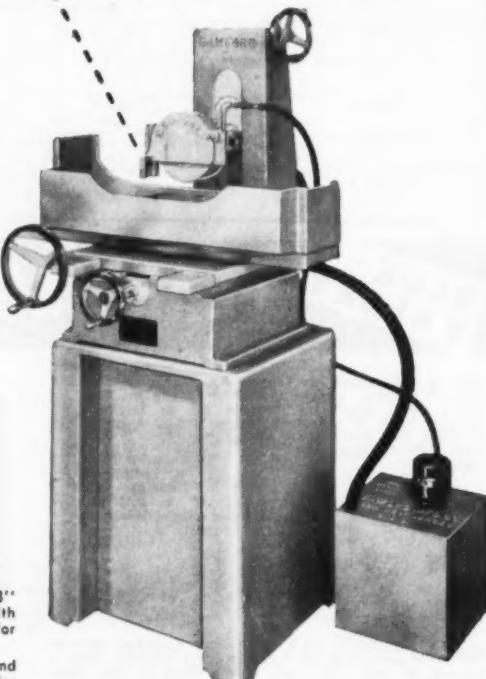
Built by manufacturers who concentrate on small grinders only, each Sanford Grinder is an individual project of time tested and proved basic design. Although modest in price, no quality undermining short-cuts are employed to reduce manufacturing costs. Constant repeat orders prove its acceptance.

This sensitive machine grinds to micro-inch accuracy with no vibration, with maximum dimensional stability. Here's why:

- Transverse ways are double Vee (VV) Mechanite inserts instead of flat surfaces which depend upon unstable jibs for alignment and accuracy.
- Needle, Ball and Oilitc Anti-Friction bearings are used throughout.
- Alignments are electronically checked for accuracy.
- Precision slides are ground, lapped and hand spotted.
- Dials are large and legible.

SPECIFICATIONS — 8 $\frac{3}{4}$ " transverse — 13" longitudinal—12" vertical under 7" wheel with Adapter. Approximate weight 630 lbs. Send for illustrated bulletin.

Replacement parts, special attachments and reconditioning facilities are available. Send for price list.



*With optional equipment

SANFORD MANUFACTURING CORP.
1026 Commerce Ave., Union, N.J.

MODERN TOOLS

*in
ACTION*

Carbide Tooling Reduces Profiling Time Despite Severe Interrupted Cutting

PROFILING TIME on 5 $\frac{1}{4}$ " dia. SAE 4340 steel rotor yoke forgings (90 to 120 lbs. psi tensile strength) has recently been reduced from 2 $\frac{1}{2}$ hours to 25 minutes floor-to-floor time at the Morton, Pa., plant of Piasecki Helicopter Corp., by switching from hss tools to Kenedex triangular insert tungsten carbide tooling for this extremely severe interrupted cutting operation. Work is handled on a 7 $\frac{1}{2}$ hp Reed Prentice 20" engine lathe having a shop-built cam profiling fixture.

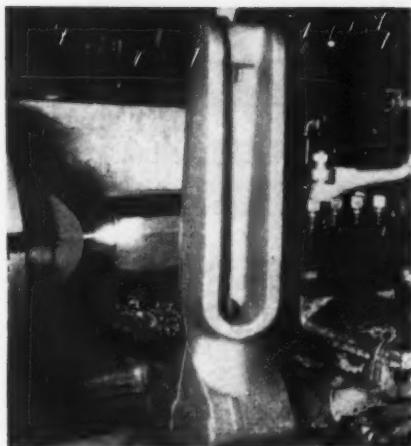
Heretofore, both rough and finish turning of the forgings were performed at 0.008" feed, 120 sfm, and 0.020" depth of cut. To profile one piece at this relatively low speed required 15 passes for a total time of 150 minutes.

Floor to floor time for profiling SAE 4340 rotor yoke forgings (90 to 120 p.s.i.) reduced from 2 $\frac{1}{2}$ hours to 25 minutes at Piasecki Helicopter Corp., Morton, Pa., by switching from hss to Kenedex triangular insert tools. To profile one piece with previous tool required 15 passes for total time of 150 minutes. Now, with Kenedex indexable button tools which are operated at 4 $\frac{1}{2}$ times greater surface speed and up to five times the depth of cut, only 4 passes are necessary per piece for a floor to floor time of 25 minutes.

By use of standard Kenedex style 3TKD-50 tools having triangular inserts of Kenametal grade K3H, the job is handled at 4 $\frac{1}{2}$ times greater surface speed and up to five times the previous depth of cut taken. Now only 4 passes per piece are necessary for a floor-to-floor time of 25 minutes. Under the new tooling setup, feed on roughing is 0.018" per revolution, and 0.010" per revolution for finishing. Revolutions per minute are 405 at 556 sfm. Depth of cut is 0.100" on roughing and 0.040" for finishing.

Their previous tooling setup required several tool changes during cutting operations on each piece. Under the new Kenedex setup, two pieces are profiled and then the triangular carbide insert is





Profiling time on SAE 4340 rotor yoke forging (90 to 120 p.s.i.) reduced from 2½ hours to 25 minutes floor to floor with Kindex indexable insert tools. Operation heretofore performed with high-speed steel tools which required 15 passes for total time of 150 minutes.

quickly indexed to a new cutting edge. Since three new cutting edges are available, six rotor yokes are rough and finish turned after which the insert is replaced with a new one—thus eliminating all tool regrinding. Due to the increased cutting speed and minimized machine downtime afforded by modern carbide tooling, this operation has been put on a production basis despite the severe jump cut presented by these irregular workpieces.

Want to KEEP PRODUCTION HUMMING — at lower cost?



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THROAT
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These jobs will stand up under severe service—and they're fast . . . accurate . . . steady. Modern precision machining (stressing ruggedness and simplicity) has seen to that. But it also accounts for their very low maintenance, surprisingly low cost and broad, all-around versatility. With Rousselle presses you can shear, punch, bend and form metals; cut and punch paper; form and trim fibre and plastics and handle other materials.

Since considerable savings are often possible, if you let our engineering staff assist you, we will be glad to cooperate. There is no obligation. Simply explain problem and send sample or drawing of work.

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SUPERFINISH
can solve them!

Here's a typical case where a shaft with ground surfaces was driven at a speed of 1750 r.p.m. The oil seals created enough heat to burn the shaft and stop the motor. To make matters worse, it was found that twice the original speed was necessary. So, the oil seal surfaces were *Superfinished*, and the shaft operated at a speed of 3500 r.p.m. With the *Superfinished* surfaces, no heat was developed at this higher speed. No further trouble was encountered.

Superfinishing is a quick, simple and inexpensive process. Oil seal surfaces are but one of the many applications where it can save you money. Not only can it eliminate trouble, but often it can help you reduce manufacturing costs. Gisholt engineers can advise you regarding its applications.

Write now for the booklet
"Wear and Surface Finish."

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



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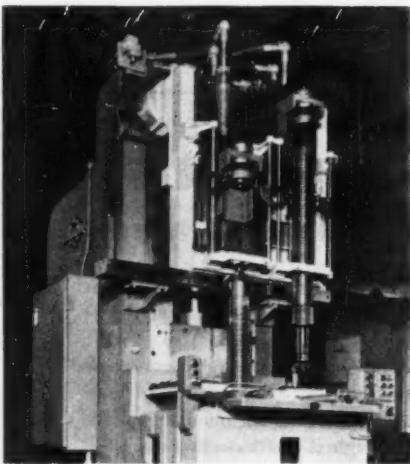
◀ **Superfinished**

Broach handling eliminated in two pass broaching on 50-ton, 72" machine

Increased production and reduced handling are the direct benefits of an ingenious broach handling arrangement developed by Colonial Broach Co., Dept. B, Box 37, Harper Station, Detroit 13, Mich. This setup, on a Colonial 50-ton, 72" stroke, pull-down broaching machine, enables large components requiring two passes to be broached internally from start to finish with minimum handling. It can be used for internal broaching of involute splines, straight splines, squares, rectangles and irregular shapes, etc.

Normally such parts are put through a roughing and semi-finishing pass, stacked near the machine and then finish broached after the broaches are changed. This means that the parts must be handled four times: Into the machine for the first pass, out of the machine for stacking, back into the machine for the second pass and, finally, out of the machine after they are finished. It is inconvenient and expensive to handle large, heavy parts

Typical internal broaching operation using Colonial dual sliding broach handling support on a Colonial 50-ton, 72" stroke, pull-down broaching machine. At start of fully automatic cycle receding work table moves into cutting position and broach at left is pulled through for roughing and semi-finishing pass. Length of cut is 5". Broaches are 5.625" pitch dia., 36 spline, 6" od.

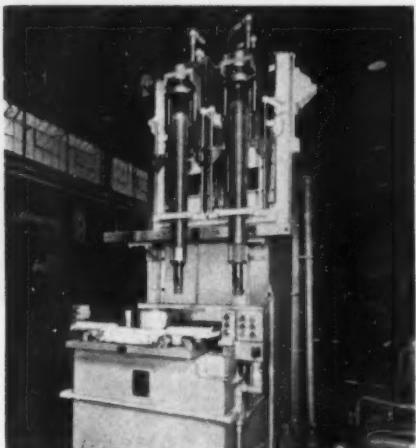


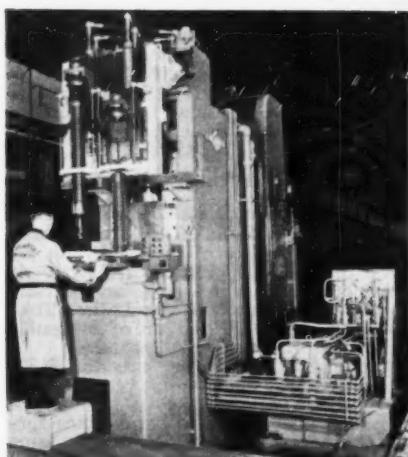
Work table shown in cutting position during initial pass. At end of cutting stroke, table recedes and broach is returned to handling puller. Handling pullers are equipped with safety interlocks which prevent shuttling of broach handling mechanism unless broaches are in proper handling position.

this often. In addition, changing broaches is time consuming and requires care to prevent damage to the cutting edges.

A major improvement in efficiency results from the installation of Colonial's dual sliding broach handling support. The part to be broached is placed in position on a hydraulically actuated receding table and requires no further handling until completion of automatic cycle. The finished part is then removed and sent along to the next manufacturing operation.

To start the cutting cycle, the operator must depress buttons at both sides of the machine, guaranteeing that both hands are clear of the machine. Once the cycle is started the following sequence is automatic: 1. Receding fixture brings the part into cutting position; 2. Initial pass broach is pulled through part; 3. Fixture recedes to clear broach; 4. Broach is returned to handling puller at top of machine; 5. Dual sliding broach handling





Second pass in cutting position as automatic cycle nears completion. When cut is completed, work table recedes, broach is returned to its handling puller and completed part is unloaded while broach handling support shuttles to starting position to complete the automatic two-pass broaching cycle.

support shuttles to the left carrying the second pass (finishing) broach into cutting position.

The table moves into cutting position and the second or finishing pass is identical to the initial pass, including return of the broach to the handling pullers. The sliding broach handling support shuttles to starting position and stops automatically, ready to begin another cycle, while the finished part is being unloaded and a new part is loaded.

Entire system is electrically controlled and has hydraulic interlocks to insure positive positioning of all components in the machine cycle. Circuit is also arranged for jog cycle to set up or try out the machine. Handling pullers are equipped with limit switches, requiring full engagement of the broach and the handling puller before the shuttling fixture controls are energized to permit sideways movement of the broach handling supports and approach of the work table to cutting position.

High-speed, air-electric gage measures highly polished part with no danger to surface

Through an ingenious combination of air gaging and electrical signalling, two OD's of a highly polished bearing are measured simultaneously by a new air-electric gage developed by Federal Products Corp., Dept. B, 1144 Eddy St., Providence, R. I.

The measurements are taken with a dual air snap and then transferred

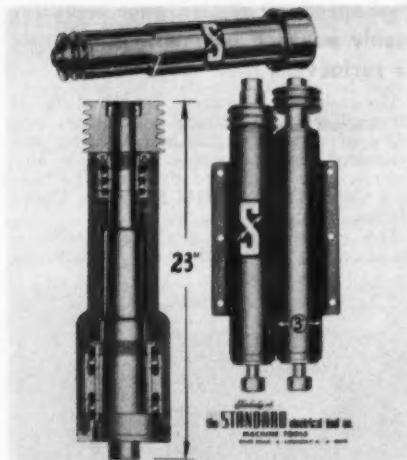


through an air-electric switch to the Electricator unit. This unit, in turn, operates a set of tolerance lights. If both dimensions are good, the green light flashes—if either diameter is undersize the amber light alerts the operator, while a red light indicates oversize. A glance at the large Dimensionair dials will tell the operator which dimension is off and how much.

Standard precision spindles solve cutting problem

Standard precision spindles recently solved a cutting problem for a manufacturer of aluminum castings. The job required that two 4" dia. holes be cut simultaneously in a casting, with 4½" between hole centers. The Standard tandem precision spindle assembly (right—photo) achieved this result. Each unit has a housing dia. of 3" and a 2-groove sheave which is powered by a 7½ hp motor with a 4-groove sheave.

The spindle at top was designed for an original equipment manufacturer for



incorporation in grinding machines.

The cutaway view shows the spindle and the ball bearing design which provides maximum radial and thrust loads, serving either as a grinding spindle or a work head. The Standard Electrical Tool Co., 2486 River Road, Cincinnati 4, Ohio.

3-D binocular magnifier

At Western Electric's Kearny, N.J., works, a Magni-Focuser, the new 3-D binocular magnifier manufactured by



Edroy Products Co., Dept. B, 480 Lexington Ave., New York 17, N.Y., is used in the mechanical laboratory for reading fine calibrations. Magnified vision in third dimension; greater accuracy speeds up precision work; allows free use of both hands; worn with or without eyeglasses.

Wire sizing, cutting machine

Bench mechanics at Temco Aircraft Corp., Box 6191, Dallas, Tex., are cranking out safety wires of correct length instead of hand-snipping them to size.

An automatic wire-sizing and cutting machine developed at the Dallas, Tex., plant turns out $1\frac{1}{2}$ " lengths of .041 gauge wire at a rate of one per second.

The machine sizes and cuts the 67,824 lengths of wire annually required for two production projects in $18\frac{1}{2}$ hours. Bench mechanics using hand dikes formerly needed 452 hours to do the same job. The machine also makes cleaner cuts to more exact lengths than did the old system.

T. J. Kittrell, a Temco precision bench mechanic who lives at 1603 Irving Blvd., Irving, Tex., designed the machine and built a wooden working model. Temco turned out a production model at a labor and material cost of only \$23.

Kittrell's machine is 40" long and rests on a table-top. Its principal part is an aluminum wheel, $12\frac{1}{2}$ " in dia. When the wheel is cranked, it operates a pull rod attached near its rim. The pull rod, in turn, activates a clamp mounted on a carriage which grabs and unreels the required length of wire from a five-pound spool at one end of the machine.

Wire is pulled the length of the machine through an aluminum tube. It emerges again through a .062 bushing, over which



**Cuts Metal
15 Times Faster
than
Hand Hack Saw!**



Slices through 1½" cold rolled steel in 41 seconds! That's fifteen times faster than a good man with a hack saw . . . *two-and-a-half times faster* than bulky power hack saws!

You can use this 16-pound work-demon anywhere—on ferrous or non-ferrous metals or "problem" materials. Take it into equipment yards, stock bins . . . tight spots where costly hand sawing is the only other answer. Use it for general maintenance, teardowns. Compact, easy to handle, Porta-Band delivers smooth controlled sawing in any position. Only the cutting part of

**NEW . . . Porter-Cable
Portable Band Saw**

**\$215.00
only**

the blade is exposed. Cutting action pulls the blade snugly into cut, holding saw firmly in place.

Powered for heavy duty . . . perfectly balanced . . . Porta-Band handles the toughest assignments. Band speed of 240 feet per minute insures swift, smooth cutting of all materials up to 3½" diameter round, or 3½" x 4¼" rectangular. Highest grade precision ball and needle bearing throughout. Aluminum alloy frame for lightness, toughness. Universal 115V AC-DC, 25-60 cycle motor (230V available at extra cost).

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Quality Electric Tools

is mounted a tool steel cutter with a shear edge.

What Kittrell calls a "cutter pressure roller" is mounted—like the pull rod—near the rim of the wheel. With each revolution of the wheel, it contacts the top of the cutter, pressing it down to cut the wire protruding from the bushing. A small spring raises the cutter after each slice is made.

Another flat steel spring keeps pressure on the spool so that wire won't backlash or unwind too freely.

Kittrell can change the lengths of the wire he cuts by moving the point at which the pull rod connects to the wheel. He figures it this way: the distance on

the wheel from dead center to the point where the pull rod attaches, doubled, equals the length to which the wire is cut.

Kittrell also can increase the pressure put on the wire by the clamp which unreels it from the spool. He would do this by lengthening what he calls the pressure lever, a short rod joining the pull rod to the pressure clamp. Increased pressure would be required, for example, to pull stiff, heavier-gauge wire off the spool.

If the need should arise, the machine could be driven by a $\frac{1}{6}$ hp electric motor. As requirements now stand, however, a mechanic can crank out a week's supply of wire in a few minutes.

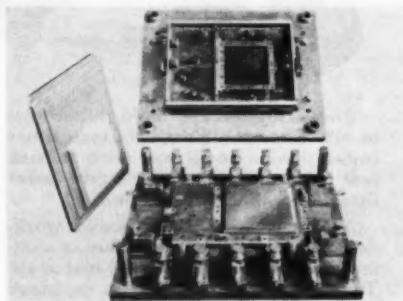
Three level horizontal and 90° piercing in single operation with adjustable units

The finished workpiece shown at the left in the accompanying photograph measures $23\frac{1}{2}$ " wide x $28\frac{1}{4}$ " long. It contains a total of 28 square holes measuring .375" and 1 round hole .880" in diameter. Fifteen of these holes are pierced at three levels in the face of the piece at the same time 14 square holes are being pierced in the formed down flanges.

Anyone experienced in die making and metal fabrication will recognize the unusual simplicity of this die and, to the time and cost conscious, the almost unlimited production and money saving possibilities through the use of this type of equipment.

The die set for the job illustrated measured 36" x 43". The die is made up from Whistler standard stock sizes of punches and die bushings. The 90° holes are pierced by Whistler HU-50 90° perforating units also available from stock. The upper and lower die plates are jig bored and tapped to precision fit. Punches and die bushings are firmly held yet quickly removed right in the press for replacement if necessary.

This application of Whistler standard punches and bushings in combination with their 90° perforating units is typical of what can also be accomplished with

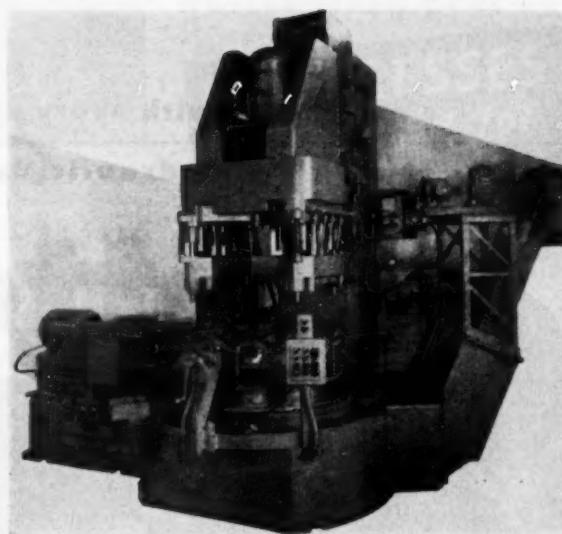


other types of Whistler perforating die equipment.

For example, adjustable punch and die units for use with T slotted die sets and magnetic punch and die units, used with a template, both comprise re-usable punch and die parts. When any single job is completed, the punches, dies or complete units can be removed from the die plate or die set and re-used in making up another job. Therefore, these parts become stock items in the tool room. Another important advantage is interchangeability of parts.

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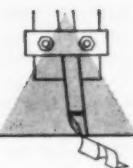
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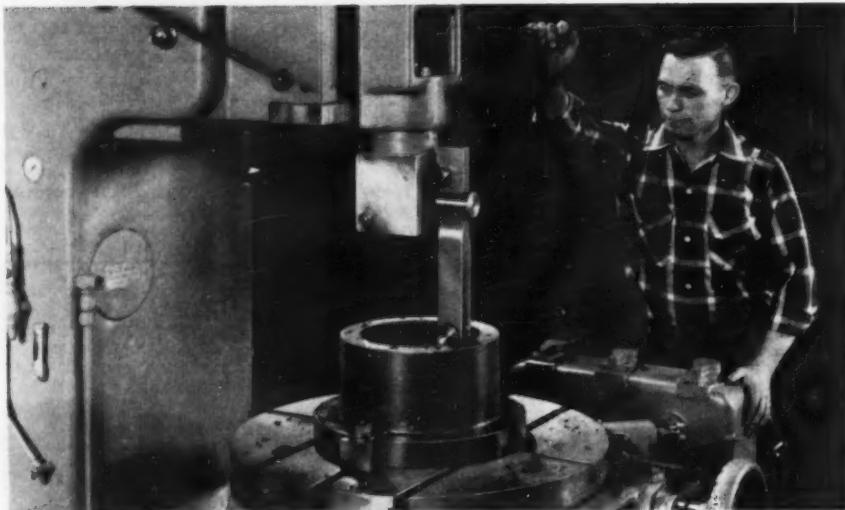
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Technical BOOKS

Machinability Report, U.S. Air Force

Prepared by Curtiss-Wright Corp., for the United States Air Force; Vol. 3, 1954; written by James Van Voast, test work by Metcut Research Associates; directed and published by Curtiss-Wright Corp., Wood Ridge, N.J.

These machinability reports, sponsored by the United States Air Force, are an important part of industrial planning for defense mobilization. The present report differs from its predecessors in that a new engineering metal is involved. Previous reports dealt with the improvement of existing machining methods for irons, steels and high temperature alloys. This book discusses the machining of a family of materials that have not yet been in high production.

Titanium metals and alloys are still very new. Production applications are scarce and interest has been focused largely on properties, availability and cost of the material rather than the manufacturing problems that will be involved. Titanium is certain to play a major role in all military material. The contents of this book should enable production planners to make accurate estimates of machine tool needs, power, cost and productivity as soon as experimental prototypes pass their tests.

Lubrication of Industrial and Marine Machinery

By Forbes, Pope & Everitt; second edition; 351 pages, illustrated; published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y.; price \$6.50.

Addressed to the man responsible for the keeping and care of mechanical equipment, the second edition of Lubrication of Industrial and Marine Machinery develops and evaluates, in lucid terminology, the fundamental facts basic to an engineer's understanding of present day lubricating systems.

This book explains graphically how to best use the fundamental characteristics of conventional lubricants to best advan-

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tage and interprets in detail the chemistry refining, compounding and specifications of the subject. It also dwells at some length on the limitations to which certain types of lubricants can be extended.

Topics are arranged in sequence, and basic principles are evolved in a manner that guards against repetition. Relative to the specific lubricating process involved, the authors include expository descriptions of some of the more common types of basic mechanisms, such as compressors, bearings, gears and pumps.

Metals and How to Weld Them

By T. B. Jefferson, editor, *The Welding Engineer and The Welding Encyclopedia* and Gorham Woods, metallurgist; 322 pages; published by The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio; fully illustrated; price \$2.00.

The authors prepared this volume to fill a need for those who are curious as to what happens when working with metals. Metals have to be joined and welding is the most logical way. This book helps to show what happens when

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This volume has been designed as a text for class room or home study. It is equally well suited to serve as a reference book for the student, the craftsman or the engineer who must deal with welding, metals and their related problems.

All of the welding processes and their uses are discussed, but the greatest emphasis has been placed on the basic fundamentals of metallurgy and the various metals that might be welded.

The welding of various metals is dis-

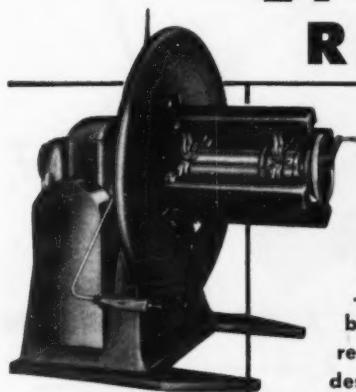
cussed in separate chapters along with the problems to be encountered.

Machinery's Handbook

By Erik Oberg and F.D. Jones; 15th edition; 1911 pages, 4½" x 7"; published by The Industrial Press, 148 Lafayette St., New York 13, N.Y.; price \$9.00; add 92 cents for Canada and overseas.

Over 1,000,000 copies of Machinery's Handbook have been printed in 14 editions since it first appeared in 1914. The new 15th edition, now ready for use, makes available the recent and basic in-

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square and hexagon bolts and nuts dimension changes; thread classes; ball, roller and needle bearings; milling cutting section; honing; carbides, etc.

How to Use Portable Power Tools

By Maurice H. Reid, author of "How to Use Hand Tools"; 210 pages; profusely illustrated; published by Thomas Y. Crowell Co., 432 Fourth Ave., New York 16, N.Y. Price \$2.95

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Engineering Analysis

By Dennistoun Wood Ver Planck and B. Richard Teare; 344 pages, fully illustrated; published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y.; price \$6.00.

The authors show what must be done to translate engineering situations into mathematical language, and what is necessary after a mathematical result has been obtained. More specifically, the

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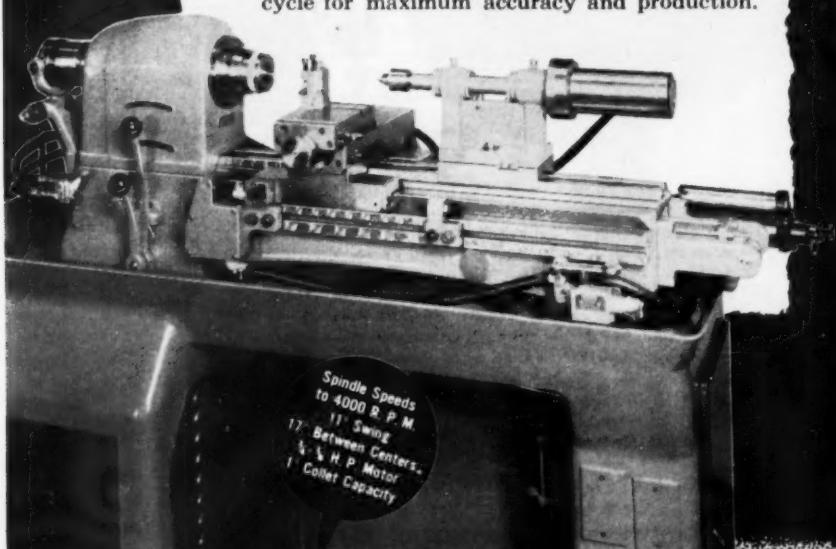
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book deals with such matters as: Defining the problem to be solved; deciding what principle to apply; choosing coordinate systems; checking thoroughly; choosing dimensionless variables; and the sketching of curves.

The book treats a number of subjects needed by engineers from the point of view of use and true understanding. The topics include material from dynamics of translation and rotation, electric circuits, heat transfer, solution of linear differential equations with constant coefficients,

uses of power series, integration by graphical and numerical methods, hyperbolic functions, and the evaluation of indeterminate forms.

To stimulate thinking, the book features an extensive collection of problems with no clue given as to the methods for solution. As nearly as practicable, the problems are representative of engineering and give the reader opportunity to experience himself what the book aims to teach.

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Elements of Mechanism

By Vinton Levy Doughtie and Walter H. James; 494 pages profusely illustrated with line drawings; published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, NY.; price \$6.00.

This book carries forward the valuable approach of the well-known Schwamb, Merrill, James, and Doughtie work upon which it is based. The new Elements of Mechanism, however, brings the reader abreast of new developments in the field by using up-to-date terminology and

examples.

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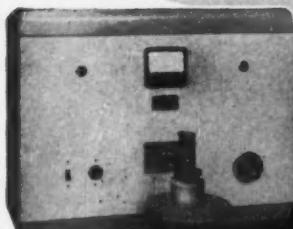
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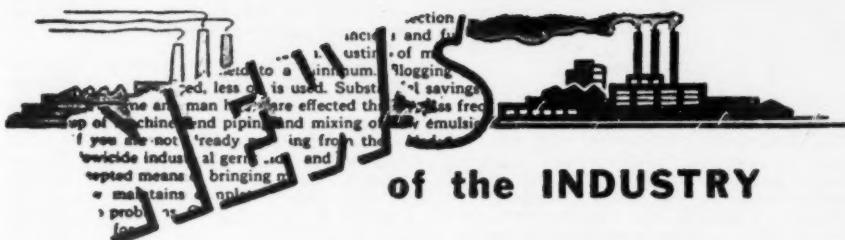


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ASTE Announces Western Industrial Exposition for 1955

Show will coincide with national ASTE convention and 5-day all-industry manufacturing and tooling conferences

THE AMERICAN Society of Tool Engineers has announced that its first Western Industrial Exposition will be held in Los Angeles' Shrine Auditorium and Shrine Exposition Hall, March 14 to 18 next year. Seventeen far western chapters of ASTE are cooperating in staging the exposition.

"Devoted to tooling, manufacturing equipment, materials and processes, it will be by far the largest and most vital industrial exposition of this type the West has ever seen," said Joseph P. Crosby, newly elected president of the ASTE. "The only major difference between the Western Exposition and regular ASTE national shows will be that it will be tailored specifically to the needs of western industry."

The event is in recognition of the rapid growth of western industry, which more than doubled its output between 1947 and 1952 alone. Decision to accede to West Coast demand to hold the exposition in the West actually was reached by the ASTE as far back as 1952. The first open date on the calendar of ASTE annual

meetings, however, was the spring of 1955.

The exposition will run concurrently with the 1955 annual meeting of the 30,000 member national technical society. Five-day all-industry manufacturing and tooling conferences will be held on the site of the exposition under the joint sponsorship of other technical societies and trade associations, thus insuring a complete program of vital information for the thousands of production men and tool engineers who regularly attend these events from all over the U.S., Canada and foreign countries.

Growth of the ASTE west of the Mississippi paralleled closely the growth of western industry—with more than 6,000 members now in this area. In the five years between 1949 and 1954 the number of ASTE Chapters in this region practically doubled, and western membership jumped 143%. In the state of California alone, membership tripled.

Well over 70,000 square feet of exhibit space will be provided in Los Angeles to accommodate 400 companies who will exhibit all kinds of production equipment, materials, processes and supplies. Over

100 companies who learned of the exposition prior to the official announcement have already indicated their intention of exhibiting, Harry E. Conrad, executive secretary of ASTE, revealed.

"Nearly 29,000 representatives of industry registered for the ASTE Exposition in Philadelphia last month, and 486 companies exhibited," Conrad said. "Judging from this and from preceding ASTE Expositions, it has been necessary to increase available floor space and alter the exhibit buildings structurally to ac-

commodate the large number of exhibits and visitors expected to participate in the Los Angeles event next spring.

Due to the fact that the ASTE has not been able to accommodate in its shows all the companies interested in exhibiting, a system of priorities similar to that in effect for other ASTE expositions has been established. An important factor in establishing a priority is date of receipt by the society of a letter of intent to exhibit at the 1955 Western Industrial Exposition.

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Scholarship program established

The Ingersoll Milling Machine Co. of Rockford, Ill., has established a scholarship program through the Ingersoll foundation at Illinois Institute of Technology, Chicago, for the benefit of young men in the Rockford area who are eager and able to prepare themselves for careers of responsibility in industry.

The scholarships will finance all tuition charges at Illinois Tech for four years and provide \$300 extra per year toward living costs for two qualified applicants who are ready to enter college in September.

The young men selected for the scholarships may enroll in a field of engineering of their own choice. They will be required to maintain satisfactory scholastic records for automatic annual renewal of the awards until the four-year period is concluded.

Scholarship recipients will be given special consideration for summer employment at the Ingersoll Machine Co. while students and for full-time employment thereafter. However, they will be under no obligation to accept such possible offers.

New net pricing program

Breaking a tradition of long standing in the abrasive industry, Norton Co., Worcester, Mass., has just instituted net pricing to make it easier to buy and sell Norton grinding wheels.

This new net unit price program means that a distributor or customer can determine the cost of a grinding wheel, segment, brick, stick or mounted point without resorting to former time-consuming procedures of applying multipliers to tabulated list prices to calculate net prices. Net prices for over 25,000 stock items can now be quoted quickly and conveniently for any listed size, shape, grain or grade of grinding wheel in any quantity.

An up-to-date Norton stock catalog with a net price supplement has been issued to all holders of the Norton distributors' manual and to some customers.

Bids accepted for foreign surplus property

The U.S. armed forces are selling large quantities of foreign excess personal property by sealed bid sales. Included are most items used by the armed forces, in various conditions. Surplus is sold on a quantity basis, although the quantity changes from invitation to invitation.

Anyone who wishes to participate in the bidding for this property may write to the USAREUR property disposal officer, APO 169, U.S. Army, specifically mentioning those items for which he wishes to receive tenders and request that his name and address be placed on the bidders' list.

If any bidder fails to acknowledge receipt of (or to participate in the bidding for) three consecutive invitations, his name is removed from the list of those to receive future invitations to bid. Before requesting that a name be placed on the bidders' list, one should remember that in most cases it is necessary to inspect the property prior to placing a bid so as to be sure of its condition. Most of the items are located in West Germany and the remainder in France.

Included among the items of excess property are: generators, transformers, hand tools, machine tools, internal combustion engines, cranes, bulldozers, trucks, compressors and pumps, metalworking machinery, office machines and equipment, rubber tires and tubes, and scrap metal.

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Name change

The Sales & Service Machinery Co., Inc., Philadelphia, have officially changed their name to Delaware Valley Machinery Inc.

No change in personnel or machine tool lines represented is involved. This is a change in name only to avoid confusion with other organizations with similar names.

Machine tool importer expands

Cosa Corporation, of New York, importer of Swiss and German machine tools, has announced formation of a new associated company: Cosa Corp. of Ohio. Sales and service throughout Ohio will be handled from the new office and showroom at 3315 Brookpark Rd., Parma, Ohio, with William Jenks, manager.

The Ohio area was covered formerly by another associated company, Detroit Cosa Corp. That organization, operating under a new name, Cosa Corp. of Detroit, will serve eastern Michigan. New and larger office and showroom are at 20118 James Couzens Highway, Detroit 35, Mich. Anton Joen is manager.

Kennametal reduces prices

Kennametal Inc., Pittsburgh, Pa., has announced price reductions of 10%, effective on standard and modified carbide tool blanks, inserts for mechanically held tools and other items made of Kennametal. This 10% reduction in basic carbide price is also reflected in the prices of brazed and mechanically held tools, dies, and other products in which cemented carbide is the essential component.

B & S to spend \$2,000,000 for modernization

The Brown & Sharpe Mfg. Co., Providence, R.I., has announced that it is making the largest single development and re-equipment appropriation in the company's history.

In a letter sent to stockholders, the company's president, Henry D. Sharpe, Jr., disclosed that the directors of the corporation have now approved an initial capital appropriation of approximately \$2,000,000 toward modernization and re-tooling of the company's automatic screw machine facility. This, he stated, is in addition to the company's customary capital appropriation for routine replacement and refurbishment, and ranks as major surgery on its production apparatus. The figure announced to stockholders covers capital expenditures only.

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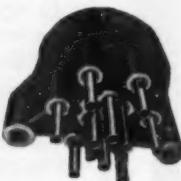
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Product moves to new quarters

The Producto Machine Co., Bridgeport, Conn., has announced the removal of the company's Rochester, N.Y., branch to new quarters at 1300 Mount Read Blvd. David S. Hodgson, district sales manager, will be in charge of the new operation.

New secretary for tool and die group

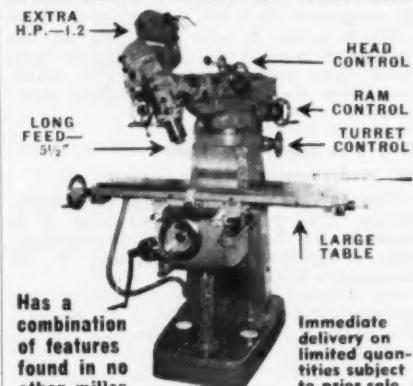


Hebert Harig, vice-president of Harig Mfg. Corp., Chicago, has been elected secretary of the National Tool & Die Manufacturers Association, it has been announced by Herbert C. Murrer of Cincinnati, association president. He succeeds the late

Albert Goldman of Philadelphia.

The association represents 800 contract tool, die and special machine shops. Harig formerly served three consecutive terms as association treasurer.

TRISON TURRET-TYPE VERTICAL MILLING MACHINE



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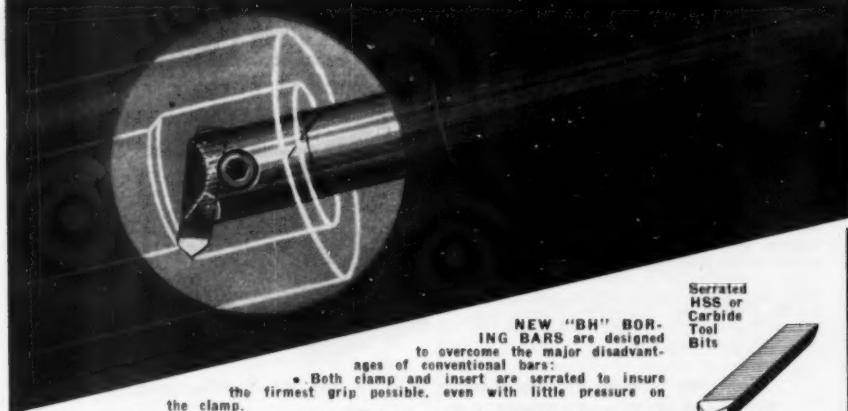
Write us for full particulars and name of your
nearest dealer.

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Mitchell 3-0316

The important role of handicapped workers in business and industry was portrayed recently at the C. A. Norgren Co., Englewood, Colo., when Glen Powless, burr room worker, won a monetary award and a certificate of merit in the firm's suggestion program. The presentation was made by C. Neil Norgren, vice-president of the firm, in the monthly meeting of employees. Powless' winning suggestion concerned a jig to hold regulator valve gages during the burring operation.



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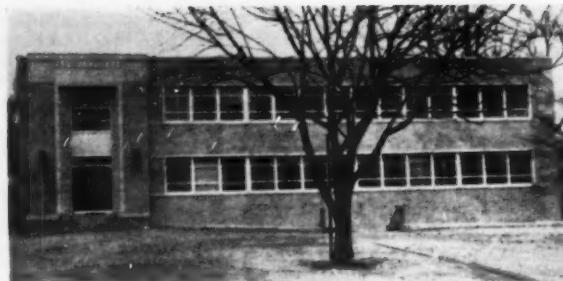
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The Philadelphia office of the Brown & Sharpe Mig. Co. of Providence, R.I. has been moved just outside of the city limits to 7 Bala Ave., Bala-Cynwyd, Pa. The new office is located in a recently completed building and continues under the direction of John J. McAleese.



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Appointments & Promotions

Cleveland Instrument Co., Cleveland, Ohio, has announced the appointment of **Robert A. Manes** as vice-president to head up the company's sales activities on precision dimensional gaging equipment.

E. W. Bliss Co., Canton, Ohio, has announced the appointment of **Samuel J. Lombardo** as sales engineer at its Philadelphia district office.

S. H. Stupakoff, formerly president of Stupakoff Ceramic and Mfg. Co., Latrobe, Pa., was elected vice-president of the Carborundum Co., Niagara Falls, N.Y., according to an announcement by General Clinton F. Robinson, president of Carborundum. The Stupakoff firm, which manufactures ceramic and other components used in the electrical industry, was acquired by The Carborundum Co. in early 1954 and was recently made a division of Carborundum. As a vice-president of the Carborundum Co., Stupakoff will continue to direct the activities of the division. Assisting him will be: **R. S. Barbaras**, sales manager; **R. E. Stark**, manager engineering; **E. H. Fritz**, manager manufacturing; **R. C. Byers**, manager quality control; **W. J. Callaghan**, purchasing agent; **H. J. Digenis**, manager production control; and **N. G. Graham**, supervisor of accounting.

The American Emery Wheel Works, Providence, R.I., has announced the retirement of **Arthur L. Pierce** after 46 years of service with the company. At a recent stockholders' meeting the following officers were appointed, all of whom have had an active interest in the company for many years: **Frederick J. Darby**, president and works manager; **Harold O. Skoog**, vice-president and ceramic engineer; **Torrey Allen**, treasurer and general manager; **William W. Turner**, secretary and sales manager. **John A. Doherty**, previously connected with the main sales office, has been appointed abrasive engineer for the Rhode Island and adjacent Massachusetts territory.

The following men have been elected to offices of the American Supply & Machinery Manufacturers' Assn.: president, **T. D. Vander Voort**, Clemson Bros., Inc.; first vice-president, **Clarence B.**



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T-Slot bolts, $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ " dia.
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Noelting, Faultless Caster Corp.; second vice-president, Charles T. Jordan, The Charles Parker Co.; secretary, S. H. Cross, Stanley Electric Tools; treasurer, Dan C. Swander, Jr., The Columbian Vise & Mfg. Co.

New officers have been announced for the National Industrial Distributors' Assn. They are: president, Richard H. Barr, Reilly Bros. & Raub; vice-president for Areas 1 and 2, Stuart A. Russell, J. Russell & Co., Inc.; vice-president for

Areas 3 and 4, Frank M. Cruger, Indiana Manufacturers Supply Co.; vice-president for Areas 5 and 6, C. E. Gollwitzer, Pratt-Gilbert Hardware Co.

New officers for the Southern Industrial Distributors' Assn. are: president, C. McD. England, Jr., Logan Hardware & Supply Co.; first vice-president, Paul J. Stine, Harry P. Leu, Inc.; second vice-president, Ashley DeWitt, Brigg-Weaver Machinery Co.

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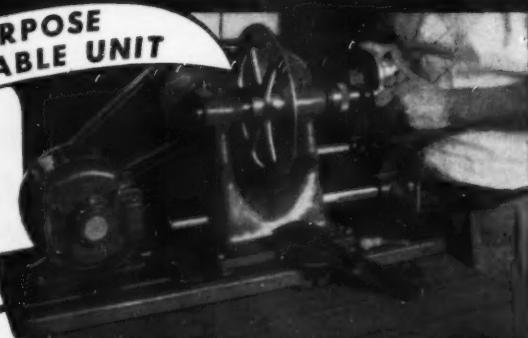
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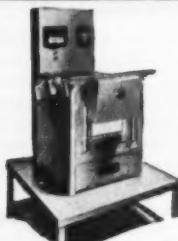
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will actually turn out more pieces per hour too. With double V-belts to the spindle Sheldon lathes deliver enough power to take heavy cuts in direct drive, at high speeds. Sheldon's "Zero Precision" Taper Roller Bearings permit work to the closest tolerances. Sheldon are such extremely accurate bearings used in moderate priced lathes.

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What's New

IN METALWORKING

Landis Heavy Duty Centerless Grinder

A NEW CENTERLESS GRINDER, No. 12½ model, has been developed by Landis Tool Co., Dept. B, Waynesboro, Penn. The machine, a heavy duty centerless grinder, is said to grind parts to extremely close tolerances on a high production basis, with features that make the application of automation both practical and economical. Automatic loaders and automatic cycles can be used for production of parts by either the infeed or thru-feed method.

This centerless grinder is recommended for grinding cylindrical work pieces that may be more economically finished by centerless grinding than by center-type grinding.

Either thrufeed or infeed grinding operations may be performed on this machine. A variation of the infeed method, known as endfeed grinding is used when grinding tapered work.

Centerless grinding is used extensively when parts are to be produced in large quantity. Exclusive features of the Landis centerless make change of setup quick and easy so that the machine can also be used for miscellaneous small lot production.

The No. 12½ centerless will grind work pieces with a maximum diameter of 6". Maximum



grinding wheel width is 10".

A variety of extra equipment and tooling is available. This includes hydraulic grinding feed, automatic cycles, hand and automatic work loaders, automatic dressing with automatic diamond feed, heavy duty work rests and sizing gauges.

An outstanding feature of the Landis No. 12½ centerless is pressure lubrication for the grinding wheel spindle bearings. This method floods the bearings with filtered lubricating oil from a separate reservoir. This system has its own pump and safety pressure switch. Pressure must be built up in the circuit before the wheel drive motor will start. If pressure should fail, the drive motor will stop.

Microsphere bearings are used for both the grinding wheel spindle and regulating wheel spindle. These bearings are one piece steel units and babbitt lined. They operate at extremely close clearance which results in very close dimensional control and quick, positive sparkout. Thrust is absorbed by the bearing which eliminates any need for extra thrust absorbing mechanism.

Two methods of dressing the regulating wheel are available. The one method dresses the wheel on the line of work contact by hydraulically moving the wheel head past a diamond mounted on the work rest. For those users who prefer an overhead dresser, Landis provides a dresser for hand operation and compensation for wheel tilt. A hydraulically operated profile dresser is also available for the regulating wheel head. The regulating wheel speed is variable by rheostat control.

The unusual feature of the Landis centerless is the arrangement of the machine elements. The grinding wheel is at the right hand side of the machine. The regulating wheel is on the left hand side of the bed. Between the two is the work-rest mounted directly to the bed casting. Both wheelheads slide on ways. The work rest is positioned rigidly between the wheels. The regulating wheel head may be tilted for through feed grinding operations. It may also be swivelled for taper grinding.

Use ACTION Card, opposite page 64. Encircle No. 1

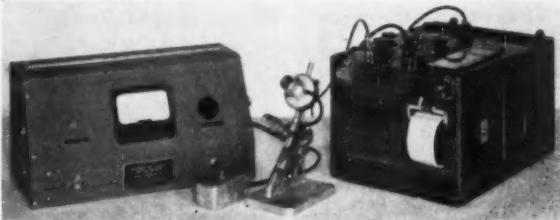
Electronic dial indicator and size recorder employs mechanical, electronic units

This device employs a combination of mechanical and electronic units. A conventional Johnson thread comparator with a standard "D" size dial indicator actually measures the piece being checked mechanically. A potentiometer is mounted on the dial. This reading is transferred electronically to the control shown at left. This unit actuates the recorder shown at right.

The cycle of operation is as follows: First, insert the piece to be tested into the comparator; second, press switch button (left center)—this actuates the tape recorder, the time cycle automatically advances the tape; third, remove piece being tested.

This unit gives three simultaneous and similar readings—the mechanical dial for the machine operation, the meter reading to verify the recorder reading, and finally the permanent tape record. The tape recorder can be remotely located if so desired. The Johnson Gage Co., Dept. MB, Bloomfield, Conn.

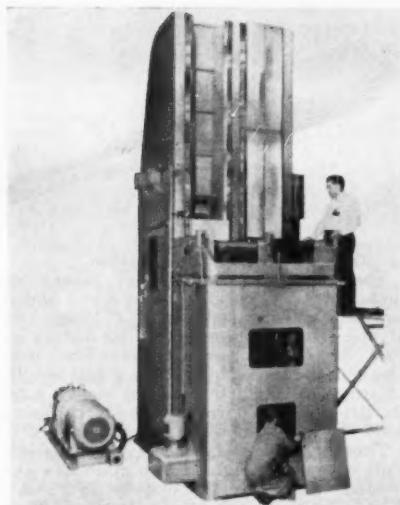
Use ACTION Card, opposite page 64. Encircle No. 2



Double ram vertical broaching machine with electro-mechanical drive

Asserting it to be the first of its kind, the LaPointe Machine Tool Co., 34 Tower St., Hudson, Mass., has announced a vertical broaching machine with electro-mechanical drive. Although primarily designed for high-production broaching of large aircraft engine turbine buckets, this double ram machine is adaptable to the mass production of other parts requiring surface broaching, the manufacturer claims.

Variable speeds are obtainable through



a simple turn of a knob on the side of the machine. The electro-mechanical drive is designed around a constant torque variable speed d.c. motor, through

a double gear box, and using a positive lock between the two rams. The main drive gear is a continuous tooth herringbone type gear and rack. The second reduction is through helical gears, and the third reduction is through a spiral bevel gear coupled through a d.c. motor.

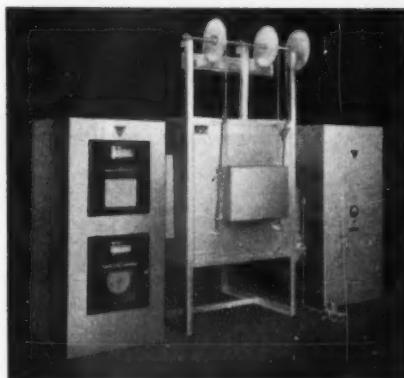
Smoothness of operation of this machine at high speeds is claimed, due to weight of machine, built-in rigidity, and the electro-mechanical drive. Advantages resulting from its smooth broaching operation are said to be: an increase in tool life amounting to 400% to 500%; a saving in down-time; work of great accuracy and finer finish.

Use ACTION Card, opposite page 64. Encircle No. 8

Greenerd builds telescoping cylinders for special application

A special hydraulic press of the pull-down type requiring two telescoping cylinders to move the main cylinder and ram to different points above the work table, and hold it there for an indefinite time, and in an accurate position without dropping, within a period of twelve to fifteen hours, necessitated the building of the cylinders by Greenerd Arbor Press Co., Dept. B, Nashua, N.H., when none

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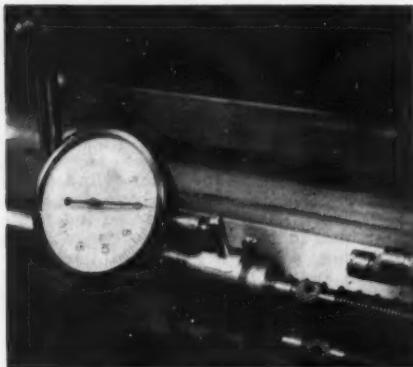
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• Particularly suitable to W & S, J & L and Gishols. Be sure to specify make and model. Guaranteed to hold to .001 on any lateral dimension from face off to steps, grooves, etc. Eliminate human element of feel.

Saves time on set-ups and between shifts. Exceptionally accurate and fast on re-work. Chrome plated and case hardened for longer life.

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could be found on the market.

The cylinders are made of Meehanite metal and steel carefully bored and honed to size and equipped with "O" rings, and of the single action type. The rating at 1000 lbs. psi is as follows: The first sleeve has 15,900 lb. lift with a full length of travel of 6 $\frac{1}{2}$ "; the second sleeve 8,295 lb. lift with 6 $\frac{1}{2}$ " travel; the third sleeve 3,976 lb. lift with 6 $\frac{1}{2}$ " travel.

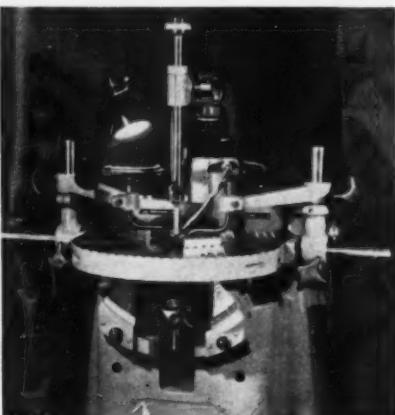
The shut height from eye to eye is 14". Full extended height, three cylinders extended, from eye to eye is 33 $\frac{1}{2}$ ". All tolerances are held extremely close. This cylinder is made for oil power only.

Use ACTION Card, opposite page 64. Encircle No. 4

New design filing and sawing machine

Modern shell construction is featured in the new design precision reciprocating filing and sawing machine from Nassovia, G.M.B.H., Germany.

The table has rigid bearings, because an adjustment of table height is not necessary, since the table tilts in four directions. The machine also contains a continuous flow blower for blowing away



filling and sawing chips from workpiece.

Stepless change of working speeds is made possible by a built-in Prym speed unit and by means of a handwheel while machine is running or standing still. Reverse speed is about three times greater than working speed.

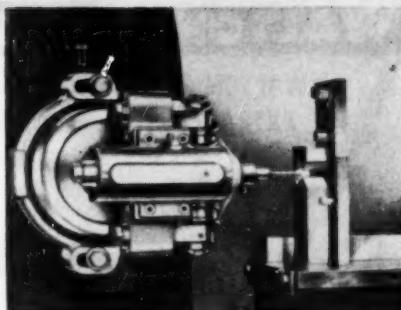
Thiel saw guides, located directly above and below the workpiece, assure accurate and sensitive cutting independent of table tilt, it is claimed.

New hold-down clamp with pre-tension eliminates the need of complicated bracket, thus providing unrestricted working space over the table and rapid clamping of the workpiece. Carl Hirschmann Co., Dept. BB, 30 Park Ave., Manhasset, L.I., N.Y.

Use ACTION Card, opposite page 64. Encircle No. 5

High speed grinding attachments feature two minute change-over

Liberty high speed grinding attachments, the vertical and the horizontal, products of the F & D Machine and Tool Works, Bridge St., Three Rivers, Mass., convert surface grinders into high speed precision grinders for small wheels in just two minutes, it is claimed.

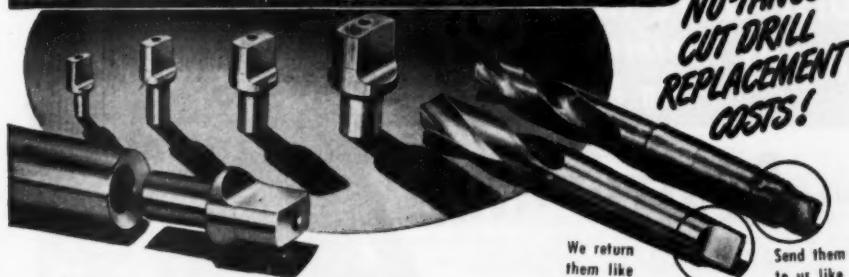


The attachments increase the capacity of grinders 50%, yet they require no additional floor space. Both models are mounted without additional machining and use wheels up to 1½" dia.

The Liberty high speed spindle is pre-loaded by an ingenious spring arrangement which compensates for wear. It is claimed to be always in static and dynamic balance. The precision ball bearings eliminate vibration.

Use ACTION Card, opposite page 64. Encircle No. 6

NEW DRILLS FROM OLD WITH NU-TANGS



We return
them like
this!

Send them
to us like
this!

Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG® process replaces twisted or broken tangs with brand new tangs of correct size—and with GUARANTEED ORIGINAL STRENGTH. No welding—No distortion—No shortening of drills—No sleeves.

Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.

* Patent No. 2,512,033.

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Broken
Taps

Universally used for removing stubborn, balky taps that break off deep in threaded work. Quick, easy, inexpensive. Will not damage threads. In 2, 3 and 4 flute styles—sizes No. 4 to 1½".

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Save Time and Labor
on Tool Changes.



Many holders in one. Head will swivel around an entire circle. May be set for straight, right or left hand offset positions. Will hold with perfect grip any size square or round tool bit or boring bar from $\frac{1}{8}$ " to $\frac{7}{16}$ ".

“REPS” PIPE & STUD EXTRACTORS

Reduce Labor Costs
For Removing Pipes
Studs and Screws



For removing broken pipes or studs that defy movement. “Reps” makes a strong four point grip without hammering or pounding. Hardened steel. Pulls rather than reams. In sizes, for every pipe from $\frac{1}{8}$ " to 2", every stud and screw from $\frac{3}{8}$ " to 3½".

(*Reps. Tool Company, Inc., a Walton affiliate.)

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Increase production up to 800%... save time, cut costs. MULTI-DRILLS make any drill press produce more. Attached without alterations or special tools. Quick, easy setup of universally adjustable spindles give you more flexibility... wider application. Handles any hole pattern within 9" circle; centers close as $\frac{1}{2}$ ". Extension Spindles available to increase working area to 22½". Special adaptations available.

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COMMANDER MFG. CO.
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Drills 2
to 8 holes
at one
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model
900



See your Commander Distributor for complete details. Write for the NEW Commander Full Line Catalog No. 851.

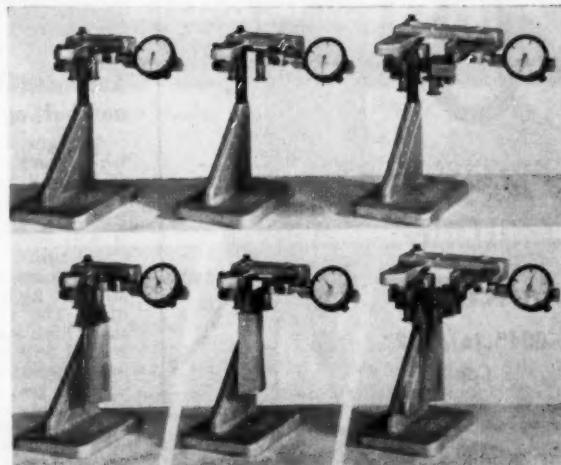
Product of Commander... Builder of Production Tools

Christmas tree comparator

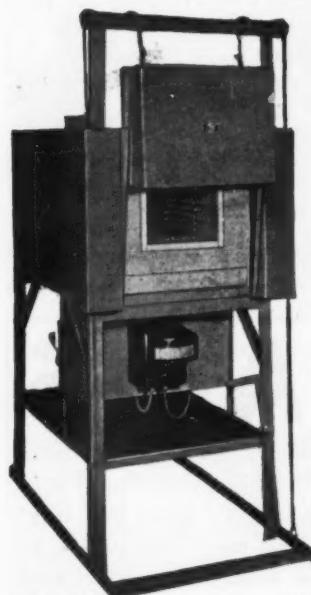
This device, product of the Johnson Gage Co., Dept. BB, Bloomfield, Conn., is comprised of three separate units. Two of the units are analytical comparators for checking the smallest and largest serrations only, the third unit checks cumulative (functional-assembly) size. Comparators are standard fixed cradle type, Model C, with the rolls modified to the proper profile.

In the gaging operation, the lower left photograph illustrates checking the smallest serration for size and straightness. The center view shows the checking of the largest serration for size and straightness. The right view shows multi-ribbed rolls checking the cumulative size.

The differential reading between the



smallest and largest serrations gives the tree taper error. The differential reading in the cumulative unit shows an off lead



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These sturdy production type Huppert electric furnaces not only attain highest efficiency, but also cut operating costs to a minimum through the unique Huppert method of using multi-insulation surrounding all sides of the heating chamber. Heat range—continuous up to 1850° F., intermittent opera-

tion to 1950° F., can also be built for 2300° F. operation. This furnace comes complete with an indicating electronic temperature controller, and a tight seating, wedge-type door is used. Standardly furnished for 220 V. AC single or 3 phase operation. (110 V. or 440 V. models to order.)

This model built in 20 different sizes

Model No. 16 illustrated—12"x8"x18"—\$925.00 complete

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.004" to 5/32"

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Three Types of Super-Accurate
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.0005" or Adjustable to Absolute
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Makes troublesome short runs easy, economical . . . Features . . . Minimum side play through use of smaller precision spindle bearings and widely spaced quill bushings . . . The exact speed for best drilling with continuously variable speed control: 1000 to 10,000 RPM or 2500 to 15,000 RPM . . . Special slow quill feed on dual feed models for drilling below No. 60 . . . Minimum vibration—direct motor drive—no belts.

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THE ELECTRO-MECHANIC CO.

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condition. Units can be mounted and grouped and a guide provided that will facilitate the handling and positioning of the pieces being checked.

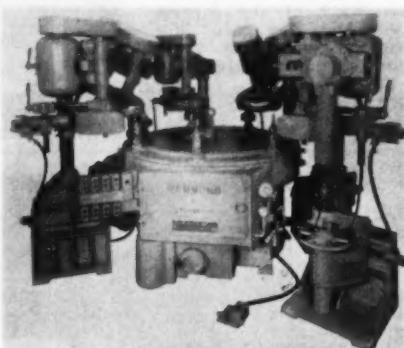
Use ACTION Card, opposite page 64. Encircle No. 7

Automatic indexing polishing and buffing machine

A larger rotary automatic indexing polishing and buffing machine, Model K-62-7, is a recent new development by Hammond Machinery Builders, Inc., Dept. BB, 1614 Douglas Ave., Kalamazoo, Mich. It will accommodate up to six head and stand units.

The indexing turret is 62" outside dia. and 42" high from floor to top of spindles. The machine operates on a constant high speed index movement of one second and has an adjustable dwell period. Operating range is from 150 to 1700 indexes per hour.

The table is locked in each indexed po-



sition by a tapered lock bolt that engages the table. Lock bolt is pulled from the table prior to indexing by a cam on the Geneva lever shaft.

Use ACTION Card, opposite page 64. Encircle No. 8

CAMS

All types - to your specifications.
Also cylindrical contour milling.

SHAKER TOOL and DIE CO.
9821 Bessemer Ave. Cleveland 4, O.

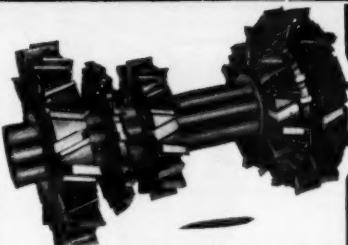
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Adjustable for diameter or width.

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APEX TOOLS FOR LIGHT OR HEAVY PLANER WORK

Adjustable serrated for maximum wear. Over 50

standard shapes of tool bits interchange in one holder. Angle tools for Plate Planers carried in stock. Special shapes to order.



Tools drop-forged of High Speed Steel, Super Cobalt Steel, or tipped tools of Stellite, Rexalloy, or any grade or make of Carbide. Furnished ground ready for use.

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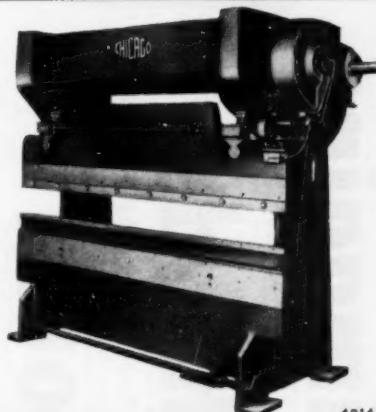


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43 Standard Sizes

Readily adapted for a wide variety of bending, forming drawing, notching, blanking, punching, embossing, etc.

DIES Complete Line of Induction Hardened Dies for All Makes and Sizes of PRESS BRAKES.



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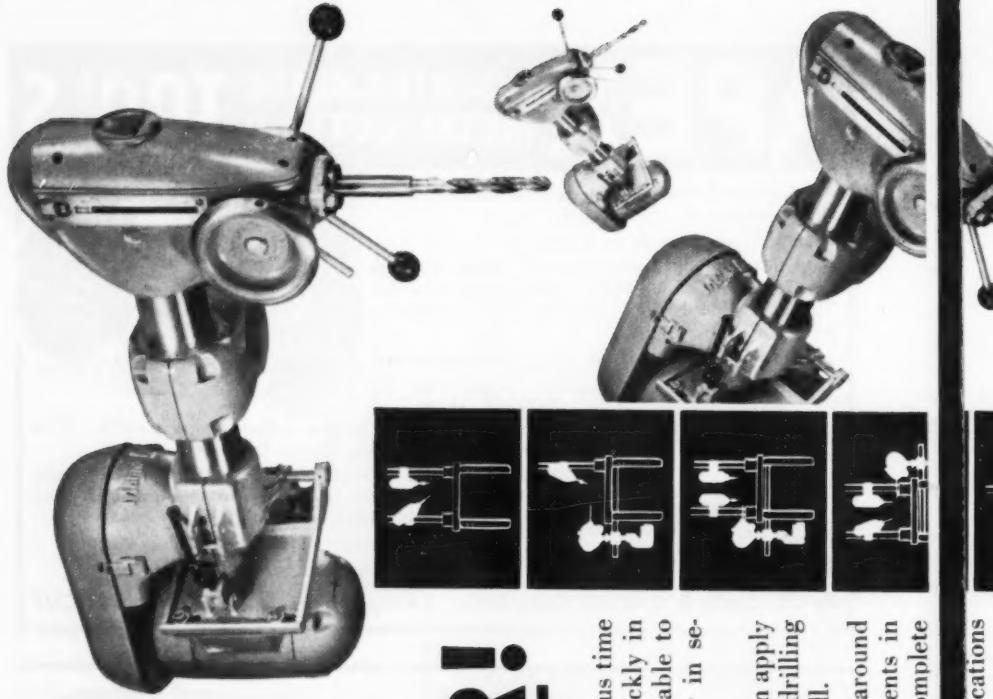
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A startling concept? Using MAGNA DRILL, you can apply it right now in your own plant. Not only for special drilling and tapping jobs, but for standard operations as well.

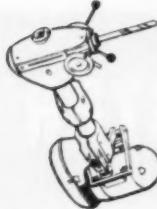
For with MAGNA DRILL, you build the machine around the part—just as if you were anchoring the components in air instead of to the rigid steel columns that provide complete

Interested? Then let us send you details, specifications

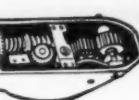
the part just as if you were anchoring the components in air instead of to the rigid steel columns that provide complete

Interested? Then let us send you details, specifications and prices. Also application sheets showing how other manufacturers are making profitable use of MAGNA DRILL—complete with cost breakdowns. Simply mail the coupon.

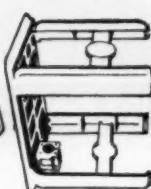
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POWER FEED (Mechanical Type). Quickly attached. Feed rates .003" to .012" per revolution. Solenoid engine. Spring return. Automatic cycling. \$105*.



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 Would like to arrange a showing of the MAGNA DRILL film on or about _____ (date).

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Now you can see the full, dramatic, cost-cutting possibilities of MAGNA DRILL right in your own plant. A 20-minute, 16mm sound film is available for showing to interested groups wherever they may be located. Just address your request to **MAGNA DRILL** Corporation, Menlo Park, California. We'll make all the arrangements. This is one movie you won't want to miss!



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that fit."



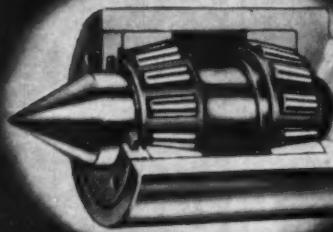
For the finest in
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cap screws, set screws,
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FALLS PRODUCTS, INC., 122 Genoa Street, GENOA, ILL., U.S.A.

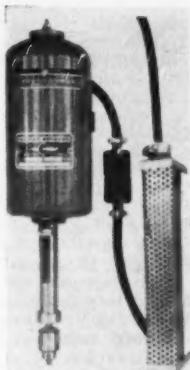
Drilling spindles for small hole work

The Electro-Mechano Co., 263 E. D'Eire St., Milwaukee 2, Wis., has announced a high speed drilling spindle unit for small hole work. It is complete with self-contained motor for use in special drilling machines which have their own feed mechanisms. Speed ranges of 1000 to 10,000 rpm or 2500 to 15,000 rpm are available.

An electric governor keeps the spindle speed constant, whether idling or drilling. Precision tolerance is held throughout, it is claimed. The unit can be mounted in any position.

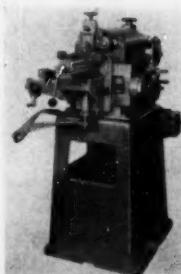
The metal cage with the unit has a four foot cord and it should be mounted out of the way of chips and coolant.

Use ACTION Card, opposite page 64. Encircle No. 9



Hydraulic copying shaper

An economy hydraulic shaper for tool room, production, or copying work is now being marketed by the American Herforder Corp., Dept. B, 1546 N. Orleans St., Chicago 10, Ill. The machine is said to be capable of copying at a 1:1 ratio the most intricate work that may be held in the quick-acting vise or between accurate 360° indexing centers while the tracer follows the contour of a simple template. Use ACTION Card, opposite page 64. Encircle No. 10



Ram-type milling machine with dovetail ways

A medium-size ram-type milling machine for tool room and production use being offered by the Fray Machine Tool Co., Dept. BB, 2935 Ontario, Burbank, Calif., is claimed to have the weight and

INCREASE PRODUCTION . . .



Above is shown a 6M Fen Automatic Wrench operating a 28" heavy duty chuck.

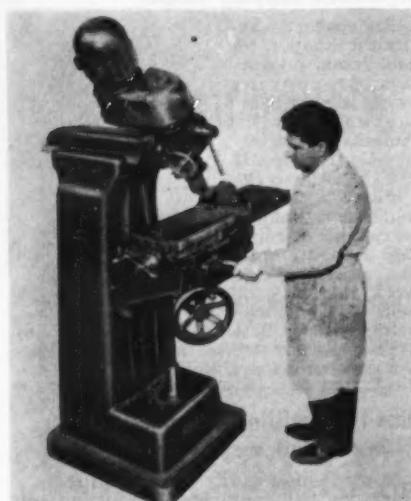
ELIMINATE "WRENCH WRESTLING"

You can put the advantages of the Fen Automatic Wrenches to your work right in your own shop on machines already in operation, or specify them on your new standard or automatic machines.

For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

THE FEN
MACHINE COMPANY
28914 Lakeland Blvd.
Wickliffe, Ohio

stability to handle a wide variety of jobs accurately and fast. It is available in two table sizes—9" x 36" with 22" longitudinal



travel and 9" x 42" with 28" longitudinal travel.

Designated Model 1½ V, this machine

was designed to take advantage of high speed steel cutters, while offering the rigidity and speeds necessary for use with carbide cutters. It is equipped with the Type 4 precision milling head, a heavy duty quill type attachment that permits the operator to work to close tolerances. The quill has 3½" of travel, and its weight is adjustably compensated for sensitivity. The standard head is equipped with a ¼ hp motor, and optional motors are available to supply the head with 1 hp or 1½ hp.

The milling head is equipped with both lever and hand wheel feed in a wide range of speeds: standard—450-6400 rpm, 6 speeds; optional with back gear unit (extra cost)—150-6400 rpm, 8 speeds; 75-6400 rpm, 16 speeds.

Manufactured in two sizes, the Fray heavy duty dovetail ram assembly on the Model 1½ V milling machine has a 12½" standard ram travel or a 20½" optional ram travel.

Use ACTION Card, opposite page 64. Encircle No. 11

Hydraulic tracer

The new Trace-O-Matic hydraulic tracer attachment manufactured by Axelson Mfg. Co. Div., Pressed Steel Car Co., Inc., Dept. B, 6160 S. Boyle Ave., Los Angeles 58, Calif., converts Axelson's general purpose lathes into contouring production machines. Cost reduction over

**Acme's New
Direct-Reading
CHAMFER
Micrometer
GAGE**

Accurately, Directly, Reads End Diameters
Of Chamfers Up To 1". TWO MODELS—
From 0° Chamfer To 90° and 90° Chamfer
To 127° included angle maximum Chamfer
Chamfer Depths Easily Computed

- Reads like any standard depth micrometer. Precision made for close tolerance work. Saves time, reduces error, reduces rejects. Quickly pays for itself. Send for details NOW!

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Simple
To Use

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former methods and the ability of the lathe to handle a variety of work that formerly presented production problems are claimed. Reverting to a standard lathe takes only 15 minutes.

The unit does not restrict the swing or capacity of the lathe. Small job lots or quantity production work can be handled equally well. If so desired, the tank unit can be arranged so that it will not interfere with a taper attachment.

Parts are duplicated from flat templates which can be put on the machine and positioned for the work in a few minutes. In the normal operation, when the template is aligned, cuts are made with the finishing tool on the first work diameter until that dimension is obtained. The

stylus arm is then swung and adjusted to bring the stylus on the template. The standard cross feed dial allows diameter sizing in thousandths of an inch and thereafter the template automatically sizes all other diameters and contours. Lengths are then set to the thousandths of an inch by a graduated dial on the template holder.

After setting up the machine the operation becomes that of load and unload. Since the precision of the template is reproduced in the finish work automatically, it is not necessary to stop the machine for constant measuring or checking. Use ACTION Card, opposite page 64. Encircle No. 12

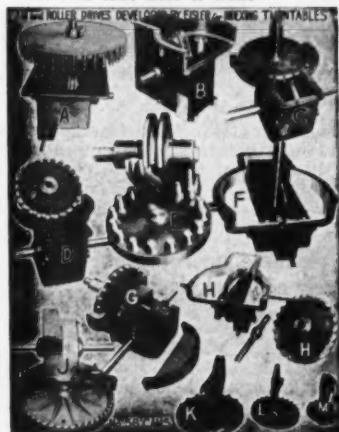
Punch provides close center-to-center mounting

Originally developed for use in their own plant, Wilder Mfg. Co., Inc., Dept. B, Route 2, Box 880, Carmel, Calif., has announced the availability of Punch Pal for transferring brake marks, hole centers, cutouts, etc.

It is claimed that pattern prick mark holes are not enlarged when using the Punch Pal. It eliminates the use of a hand prick punch to locate marks on sheets or plates. Accuracy of duplica-

INDEXING TURNTABLES AND POSITIONERS

Eisler makes over 100 different types for welding, brazing, soldering, spraying, glass insulators, melting and glass glazing, with rotating stations and motorized or hand operated. Rotating tables of all kinds for over 33 years. We supply any part or complete equipment and we make special turntables to your order and cams made to order.



A SPECIALIZED CAM MILLING SERVICE, SPOT AND BUTT WELDING

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Anderson NEW, IMPROVED HAND SCRAPER

The new Anderson Model 5-D Hand Scraper is the kind of tool you can't appreciate until you have tried it. So here's our offer: Order as many Model 5-D scrapers as you want. We'll send them promptly. Use them a full week... if they don't live up to all your expectations, send them back to us for refund.

- Faster Cutting
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18" — 20" — 22" lengths

\$5.80... with high speed
steel blades

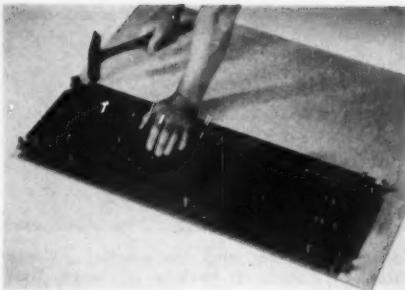
\$8.50... with carboloy-
tipped blades

\$1.50... for rubber bumper
shown below

ORDER AS MANY AS YOU NEED MONEY-BACK GUARANTEE

Indicate choice of high-speed steel or carboloy-tipped blades, and 18", 20", or 22" lengths. We suggest you include rubber bumpers in your order. Write today!

ANDERSON
BROS. MFG. CO.
1907 Kishwaukee St.
ROCKFORD
ILLINOIS



tion is said to be held to close tolerances with the added advantage of being able to move the punch from pattern to pattern and still maintain the accuracy. Punches are sold in one-dozen lots; can be installed on pattern up to 22-gauge thickness.

Use ACTION Card, opposite page 64. Encircle No. 13

Plug gages check deep holes

Shur Check plug gages, product of Acme Tool Co., Dept. MTB, 71 W. Broadway, New York 7, N.Y., check out-of-roundness in holes. Deep holes can be checked, as there is no projecting handle to interfere. Gages are claimed to have more sensitive "feel"; air pocket in blind



holes is eliminated. Manufacturer says gage is longer wearing, as it enters holes easily. Plug gages can be purchased in all tolerances—XX, X, and Y.

Use ACTION Card, opposite page 64. Encircle No. 14

Screw machine operates on front and back of workpieces in one cycle

Porter-McLeod Machine Tool Co., Inc., Dept. B, Hatfield, Mass., has announced the introduction of a Double-Matic screw machine which machines both the front and back of workpieces in one complete cycle and eliminates the need for second operation machines by performing additional work after cut-off.

The Double-Matic utilizes a tool hold-

ing turret revolving on an axle parallel to the spindle. As with other screw machines the stock is fed through, clamped and machined on the front side. However, the final turret position is occupied by a live spindle which contains a collet and runs at the same speed as the main drive spindle. This live spindle grips the workpiece, supports it during cut-off and continues to hold it. Then, while turret tools machine the next piece, the back end is machined by tools mounted on the headstock.

Almost any operation—drilling, ream-

ing, tapping, threading, forming or chamfering—can be performed as easily on the back end as on the front. Work capacity is 0" to 1" diameter, to 4½" length. Spindle speeds range from 400 to 6000 rpm. Motor is 3 hp, 1800 rpm.

Use ACTION Card, opposite page 64. Encircle No. 15

Tapping compound breaks down surface tension

Tap Magic, manufactured by Smith Tool & Engineering Co., Dept. BB, Yucaipa, Calif., is a scientific blend of chem-

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WAYS
WITH A
LUCIFER
ELECTRIC FURNACE**

1 SAVE with a Lucifer Electric Furnace on FIRST COST. Our straight line production permits economical selling price, despite use of highest quality materials throughout. Check costs on other furnaces . . . feature by feature . . . you'll save money on the Lucifer Electric Furnace EVERY TIME.

2 SAVE ON MAN HOURS with a Lucifer Electric Furnace. Less operator attention needed - Lucifer controls are EXACT. They reach SPECIFIED heat rapidly and retain SPECIFIED temperature without variation. No special experience required when you use a Lucifer Furnace.

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Furnace Size	2000'	2300'
6x 6x12"	\$ 467.00	\$ 548.00
9x 9x18"	647.50	764.00
12x12x24"	912.00	1068.90
18x18x36"	1419.75	1629.50

Complete with 100% automatic electronic controls.

CHECK THESE PRICES

WRITE FOR FREE LITERATURE, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advise without obligation. Write, wire or phone today.

LUCIFER FURNACES, INC.

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Successors to Gilbert S. Simonski Company

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icals which, by breaking down surface tension, stress and metal-to-metal adhesives set up in the course of tapping, threading, drilling and reaming, frees the tool and permits continued rotation and pressure without tool breakage, it is claimed. Threads are cut clean, inside or outside, and holes drilled to closer tolerance, as the compound cuts away oil film and prevents clogging of work hardened chips.

Although volatile, with evaporation be-

ing a measured part of its action, Tap Magic is said to be neither flammable nor explosive.

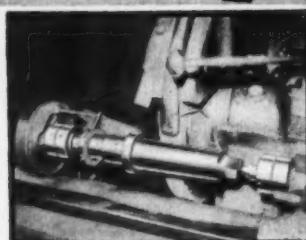
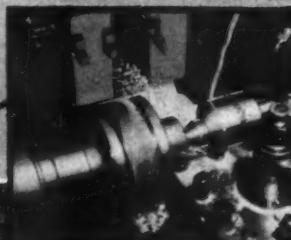
Use ACTION Card, opposite page 64. Encircle No. 16

Edlund announces improved motor spindle machine

For drilling and tapping in general production and tool room use, the Edlund Model M.S. motor spindle machines built by the Edlund Machinery Co., Dept. B, Cortland 20, N. Y., are said to offer flexi-



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AND BE SURE!

Red-E Precision CENTERS are the answer to all your turning and grinding ACCURACY problems.

Built to take weights up to 200 tons. Speeds to 4000 RPM.

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ACCURACY is GUARANTEED

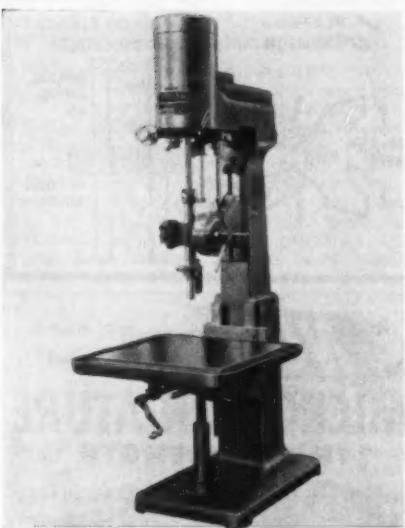
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READY TOOL COMPANY

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bility, a choice of single or multiple spindles, and selection of special-purpose

extras.

The units, in 12" and 15" overhang, are made in one to eight spindles. Designed for both general production work and tool room use, the 2 hp motor gives a drilling capacity of 1" with additional capacity to 1 1/4" using back gears. In addition, these models can be furnished with the Edlund semi-automatic power feed, reversing motor tapper and lead screw tapper. These attachments can be readily used in any desired combination on multiple spindle machines to meet specific production requirements. Direct drive rpm spindle speeds range from 600 to 3600 rpm, with additional slower speeds of 115 to 900 rpm obtainable by application of back gears.

For heavy production work or tool room service, Edlund has built the Model 4 M.S. machine. These models incorporate all the features of the 2 M.S. models with heavier construction and drilling capacities to 1 1/2". Direct drive spindle speeds range from 450 to 1200 rpm and, with back gear, from 112 to 300 rpm. One spindle to four spindle machines are available in this model with either 12" or 16" overhang.

Use ACTION Card, opposite page 64. Encircle No. 17

STOP DUST

with DUSTKOP



Low cost, immediate control of dust from one remote dust source, or from a whole shop!

300 cfm to 10,000 cfm per unit (22 models) standard, pre-tested, available from stock Ask for catalog 605-2 No obligation.

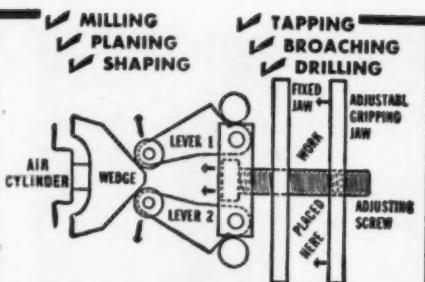
AGET-DETROIT CO.
205 MAIN ST. ANN ARBOR, MICH.

how about air vises!

AIRLOX pat'd wedge-&lever action utilizes total cylinder drive. Positive rigid grip on the work. Especially suited to CARBIDE MILLING. Five models . . . 50 to 200 lb. air line pressure. Write for data sheet. PRODUCTION DEVICES, INC., Whitehall, N. Y.

SAFE . . . POSITIVE POWERFUL

AIRLOX



Fast, Accurate Measurements
With the **AMIC** "Quick-Action"
Vernier Caliper



AT NEW LOW PRICES

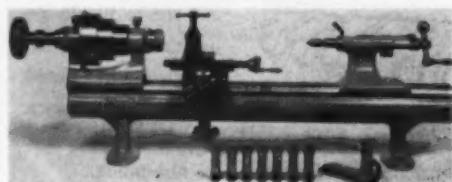
The perfect tool for machine shop, tool room inspection and Quality Control. A flick of the thumb and you've got your external and internal dimensions. Knife-edged hardened jaws provide exact thread measurements. A depth gage blade gives speedy measurements. AMIC designs are made exclusively for AMIC by an outstanding European manufacturer. Scientifically engineered, painstakingly machined, packed in a sturdy leatherette case. A tool without rival. Size 6" No. 21B. Graduation 1/40", vernier reading .001".

No. 22B, Graduation 1/40" and full MM, vernier reading .001" and 1/10 MM. Dealer Inquiries Invited

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NOW . . . an even Stronger
MICRO-MINIATURE
IN STUB LENGTH



Save Small End Mill Breakage

PRECISION GROUND FROM SOLID!

- Faster Cutting
- Long Life
- Polished Flutes
- Strength

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EASTERN DISTRIBUTORS
Karl A. Neiss, 404 Fourth Avenue, New York 16, N.Y.
Material Sales Co., 14438 W. Warren Avenue, Dearborn 1, Michigan
Midland Engineering & Sup. Co., 7516 W. Belmont Ave., Chicago 34, Ill.

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WOODSON TOOL CO.
4811 Lennox Blvd., Inglewood, Calif.

STARK No. 3 1/2 Lathe, 32" bed, Cone Bearing Headstock, Screw Tailstock, Compound Slide Rest, Tip-over Hand Rest, Collets 1-64" to 1/2" by 64ths.

The originators of the American Bench Lathe, Stark has been building quality bench lathes for over 92 years. You can depend on Stark.

Steel beam trammels designed for easier use, greater accuracy

Steel beam trammels, No. 180 Series, said to be designed to produce an accurate and easy-to-use tool for layout work, scribing, and measuring, are announced by Lufkin Rule Co., Saginaw, Mich. Free-turning knurled grips on top of each tram make the tool more convenient to use. Trams will not turn once set, as the top of the rigid beam is flattened. Spring friction prevents the trams from sliding off the beam when the clamping nuts are loosened. Scriber points are hardened for longer wear. Fine thread adjusting screw gives accurate and fine adjustment of the points.

Trammel beams are 10½", 14½", and 20" long, with 20" extension beam that circles up to 72". Also available are needle point, pen attachment, steel point and lead holding chuck, and ball point attachments.

Use ACTION Card, opposite page 64. Encircle No. 18

Gries Industries announces improved Wolpert-Gries machine for standard Rockwell hardness tests

To maintain greater precision of test results and to save in operating time, the improved Wolpert-Gries Rockwell hardness testing machine, Model HT-1, is said to incorporate several new features.

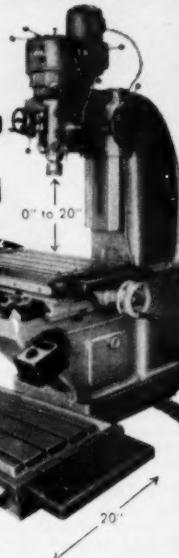
In this machine, which can perform 400 high-precision tests per hour, the 10 kg minor load is produced by gravity instead of by spring pressure. After the minor load is applied, no "setting" is required to make the dial indicator stand automatically at the correct zero. Without removing his hand from the spindle wheel, the operator can release the oil brake, applying the major load through the weight block suspended on the loading lever. Oil brake speed can be conveniently adjusted. Depth indication begins at once. When the dial pointer has almost stopped, another lever removes the major load while the minor load remains. The final test result then appears immediately.

Since the indicator never requires adjustment, it retains its high precision. A special clamping cap, which need not be



Now... a quality JIG BORER

that
every shop
can afford



The SIMA Jig Borer features an unusually large 32"x20" hand scraped table with 20" longitudinal and 15" cross travel. Designed by American shop men and solidly built by European craftsmen to combine accuracy, easy maintenance, versatility and medium price. Created to small shop specs, the SIMA also handles large capacity work to a guaranteed accuracy of .0006" in 20". 16 spindle speeds; 35-1500 rpm. Spindle design facilitates use of standard tooling. Reasonably prompt delivery on this rigid well constructed SIMA Jig Borer.

Write today for full details

AMITOOL COMPANY
629 MAIN STREET

WESTSBURY, L.I., N.Y. WESTSBURY 7-3400

QUICK CHUCK cuts drill press costs!

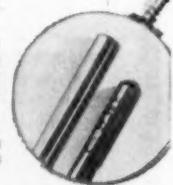


SAVES TIME—Click! one tool's out. Snap! another's in. With an AMF Wahlstrom Chuck there's no waiting for the spindle to stop! Simple hand motions do the job. No more keys, collets or wrenches to fit or to hunt for.

SAVES MACHINES—A single-spindle drill press equipped with an AMF Wahlstrom Instant-Change Chuck does the work of several! Makes it practical to drill, ream and counterbore different size holes **without moving the work**.

SAVES TOOLS—Does not chew up shanks of costly tools. Wahlstrom's four hardened and ground jaws grip without slip . . . the greater the load, the tighter the grip. Drill on left is still unmarred after 289 changes in an AMF Wahlstrom chuck.

Ask your distributor for a demonstration or write us for folder W-50.



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New York 16, N. Y.

Another  Product

WAHLSTROM
FULLY • AUTOMATIC CHUCKS

New York 16, N. Y.

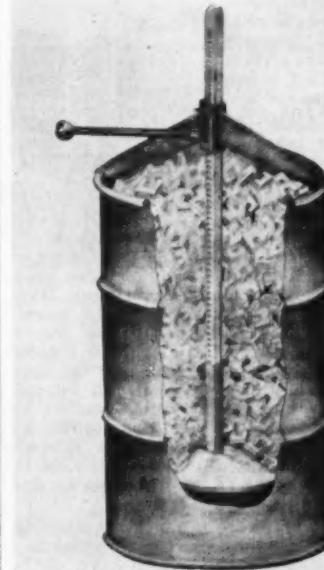
used in all cases, eliminates errors caused by backlash and improper clamping. The standard model can be adjusted to 100 and 150 kg major loads for Rockwell "B" and "C" tests. Other ranges can be provided. Gries Industries, Inc., Testing Machines Div., Dept. B, New Rochelle, N.Y. Use ACTION Card, opposite page 64. Encircle No. 19

Eliminates reaching into parts barrels

The Drumvator, a device for raising parts in storage drums to efficient work height, eliminating repeated reaching down into the parts drum and lifting the parts to the correct work height, is announced by Actron Engineering Co., Dept. 509-B, 11934 Lorain Ave., Cleveland 11, Ohio.

This device can be conveniently used at any press or machine station since it is contained within the parts drum. It does not require additional hoists, conveyors or attachments, and no additional material handling operations are necessary.

The Drumvator consists of two separate assemblies which are called the hoisting frame and the stem and platform assembly. The stem and platform assembly is dropped into the drum which will receive the parts. The machine operator can fill the drum above the platform with processed parts with or without the hoist-



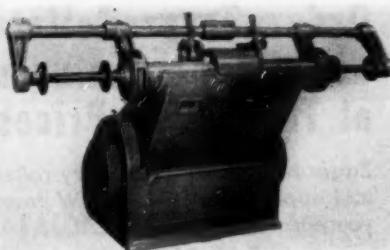
ing frame in place. When the operator has filled the drum, the hoisting frame can be quickly and easily slipped over the stem to be in position to raise the parts to a convenient level for the subsequent operation. If there is a temporary storage prior to the next operation, the parts may be stored with the stem and platform assembly may be procured separately at low cost. The stem is collapsible to the height of a standard drum to allow for stacking or drum covers while in storage.

Operation of the device is accomplished by moving the hand lever on the hoisting frame. This action raises the stem and platform assembly; capacity is 2000 lbs. Use ACTION Card, opposite page 64. Encircle No. 20

Wide swing polishing, buffing lathe

Special Model RRO wide swing polishing and buffing lathe is being announced by Hammond Machinery Builders, Dept. B, 1614 Douglas Ave., Kalamazoo, Mich.

This is a two-spindle lathe, each spindle having its own motor, motor control and V-belt drive—allowing each operator to change wheels without interfering with or causing down time for the other. Each spindle runs in three



ball bearings, one in the end of the spindle which is a part of the special outboard bearing assembly.

The heavy duty construction and rigidity of the outboard bearing permits the use of wheels up to 16" face on each spindle.

This lathe is especially suited for polishing and buffing of large and irregular shaped parts either by hand polishing or in conjunction with semi-automatics.

Use ACTION Card, opposite page 64. Encircle No. 21

Index table has mechanism outside

Air-Hydraulics, Inc., Dept. B, 255 Belton Rd., Jackson, Mich., announces a new, large, outside turning and locking index table, Model No. 48. All working

✓Check Angles to Seconds . . . with the new Bald Eagle 5" Sine Bar only \$18.75

Precision finished, double normalized body assures maximum accuracy and long life. Convenient tapped holes make set-ups easy. Surface and Rolls are parallel within .0002". Rolls are same diameter within .0001".

Immediate
Shipment

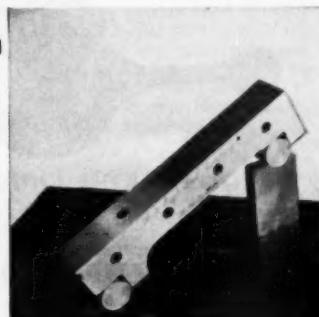


BALD EAGLE SINE PLATES AND SINE BARS

Number	Center Distance	Width	Length	Shipping Weight	Price (Without case)	Price with Oak Case
1605	5" ± .0002"	3"	6½"	7 lbs.	\$32.50	\$38.00
1610	10" ± .0002"	5"	11½"	23 lbs.	\$80.00	\$86.00
1705	5" ± .0002"	1"	6½"	3½ lbs.	\$18.75	\$21.75

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2"—

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1"—\$95

2"—\$145



COLLET LATHE CHUCK

1"—\$125

2"—\$185

AIR-OPERATED FIXTURE

1"—\$165

2"—\$195

5-C

COLLET—

\$4.90 W & S No. 2—\$6.75

ZAGAR TOOL, INC.

24000 LAKELAND BLVD., CLEVELAND 23, O.



mechanism is outside the table; adjustments can be made or working parts may be removed without disturbing the table or disassembling tooling. This model is available in sizes from 20" to 48" in diameter and with 6 or more stations. All sizes may be equipped for either air or hydraulic operation. When equipped for air, table operates on ordinary line pressures from 60 to 175 lbs.

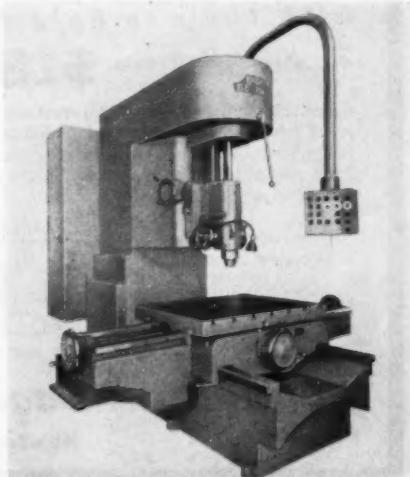
The new table has basically the same indexing mechanism as other Air-Hydraulics tables and is said to be highly accurate and completely positive without backlash, skips or overruns.

Use ACTION Card, opposite page 64. Encircle No. 22

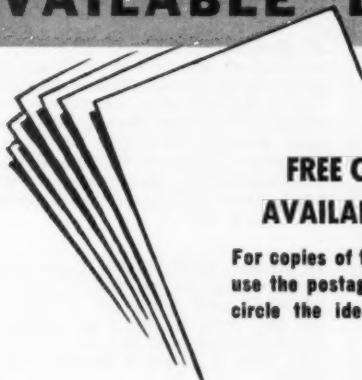
Vertical mill handles work up to 5,000 lbs.

Workpieces as large as 30"x48", and weighing up to 5,000 lbs., can be easily bored, drilled or vertical milled on the

(Continued on page 300)



AVAILABLE LITERATURE



FREE CATALOGS AND BULLETINS AVAILABLE FROM MANUFACTURERS

For copies of the literature in which you have an interest
use the postage-paid postcard on the next page. Merely
circle the identifying numbers and mail the postcard.

1. Microfinish Comparator. To announce the new S22 Microfinish comparator surface roughness scale made by Electro-forming, the Baptist Machine Co., Dept. BB, Ludlow St., Stamford, Conn., has issued a colorful four-page leaflet. Comparator permits roughness to be specified on the same basis as linear measurements.

2. Multi-Drill. The Commander Mfg. Co., Dept. MB, 4225 W. Kinzie St., Chicago 24, Ill., is the maker of the adjustable Multi-Drill, which drills up to 8 holes in one stroke—any pattern, fits any drill press. Literature available upon request.

3. Surface Plates, for layout, inspection, checking, are pictured and described in Bulletin No. 1-MD, Goodman Mfg. Co., Industrial Mfg. Div., Dept. BB, Halsted St. at 48th, Chicago 9, Ill. The manufacturer has also issued an easy-to-read manual giving installation instructions, care and maintenance suggestions.

4. Indexing Fixtures. The Model 2A-3 air operated collet and index fixture, for drilling, tapping, reaming, counterboring and milling operations, is featured in flyer being distributed by the Gustafson Engineering & Sales Co., Dept. BB, Fitchburg, Mass. Speed of indexing and collet opening and closing can be synchronized to automatic machine circuit.

5. Friction Saws, Hydraulic Power Unit. Bulletins No. 4200 and 9200 contain com-

plete information on friction saws manufactured by Kling Bros. Engineering Works, Dept. MB, 1320 N. Kostner Ave., Chicago 51, Ill. Also available is flyer describing hydraulic power unit, push button control for Kling friction saws.

6. Drill Presses. Light-heavyweight 20" drill presses, hand or power feed, product of Walker-Turner, Dept. BB, 900 North Ave., Plainfield, N.J., are colorfully portrayed in leaflet of the company. Features include: one-piece cast iron head; 10-spline spindle 1" in dia.; four heavy-duty, precision ball bearings.

7. Carb-A-Guide. By turning the dial to the type material to be machined, the Carb-A-Guide, a combination dial and slide chart, shows the proper speed, carbide grade, tool angles and chip-breaker dimensions. Also includes a speed conversion slide, a milling feed slide and a horsepower computer slide. Adamas Carbide Corp., Dept. B, Kenilworth, N.J. Price \$1.00.

8. Dust Collectors. Unit type collectors vs. centralized system, a case history involving a row of seven Cincinnati universal grinders, is the subject of Bulletin 640 No. 0, Aget-Detroit Co., 502 Main St., Ann Arbor, Mich.

9. Tool Post & Tool Holders for all lathe operations are discussed in literature of the Aloris Tool Co., Inc., Dept. BB, 131 Sanford Ave., Flushing 55, N.Y. For

production runs, short runs, maintenance, and tool and die work.

10. Cutting Tools. The F & D Machine & Tool Works, Bridge St., Three Rivers, Mass., has announced the release of its new net price cutting tool catalog, No. 14. Catalog is 8½" x 11" size, to fit desk binders, thus making reference and pricing convenient. The company's line has been enlarged to include drills and reamers.

11. Machinery Mounting. The new leveling Barrymount, designed to isolate machines from shock and vibration, reduce noise, do away with lagging, is described and illustrated in leaflet of the Barry Corp., Dept. B, 700 Pleasant St., Watertown 72, Mass.

12. Dial Gages. Bulletin 354, Boice Mfg. Co., Inc., Dept. MB, Staatsburg, N.Y., features the company's dial bore gage, bore gage setmaster, dial snap gage, and snap gage setmaster. Dial bore gage features fixed pin equalizers which position the gage in center of bore where two point gaging contacts assure correct indication of the hole conditions.

13. Surface Grinding Machine. Folder issued by the Bridgeport Surf-Ace Grinding Machine Co., Dept. BB, 315 Asylum St., Bridgeport, Conn., covers the new Surf-Ace grinding machine which features precision in tenths, v and flat bedways, cartridge spindle, ribbed castings, convenient wheel locations.

14. Selective Heating. Flamatic selective heating equipment is covered in Publication No. M-1853, the Cincinnati Milling Machine Co., Dept. MB, Cincinnati 9, Ohio. Features claimed are: high heating capacity; electronic control; versatile, low cost tooling. Operation is automatic except for loading.

15. Vertical Milling Heads. Products of the Brown Vertical Milling Head Co., Dept. B, 1615 Riverside Dr., Los Angeles 31, Calif., are described in detail in leaflet available from the company. Thirty-two sizes and models; gear rating capacity, 1½ to 15 h.p.; speed range has been increased to 4500 rpm.

16. Turret Drills. Newest literature of the Burg Tool Mfg. Co., Dept. MT, 3743 Durango Ave., Los Angeles 34, Calif., describes the Burgmaster automatic hydraulic six-spindle, Model 2BH, and the

eight-spindle, Model 3BH, turret drills. Contains operating instructions as well as information on accessories.

17. Drilling Machines. The new 12-page catalog of Cleereman drilling machines gives complete information regarding features. Spindle feed transmission has horizontal alloy steel shafts, involute splined and ground, mounted on anti-friction bearings. Write to Bryant Machinery & Engineering Co., general sales representatives, Dept. MTB, 640 Washington Blvd., Chicago 6, Ill.

18. Broach Sharpeners. Complete line of broach sharpeners for round and flat broaches and universal broach sharpening has been detailed in 4-page bulletin No. S-54, Colonial Broach Co., Dept. BB, P.O. Box 37, Harper Station, Detroit 13, Mich.

19. "Jobs? or Jobless Pay?" points out what the current guaranteed annual wage proposals are, what the effects of their widespread adoption would likely be upon the unemployment compensation programs and some of the problems that would confront any management that tried to operate under such proposals. Chamber of Commerce of the United States, Washington 6, D.C. Price, single copy \$2.00, quantity discount.

20. Drum-Type Turret Lathe. A 20-page bulletin, illustrated with photographs and diagrams, describes the Pittler (German) drum-type turret lathe, Model Pirofa 45. The attachments described should be of interest to precision industries. Cosa Corp., Dept. BB, Chrysler Bldg., New York 17, N.Y.

21. Cut-off Wheels, Grinding Discs, for universal use on high speed cut-off and hand grinding machines, are described in literature obtainable from Crown Abrasive Co., Inc., 1841 Broadway, N.Y.C. It is claimed that, due to their special construction, cut-off wheels will not break under normal working conditions, even at highest speeds.

22. Die Try-out Presses. A new bulletin (No. 330) has been released by the Dake Engine Co., 647 Monroe St., Grand Haven, Mich., covering die try-out presses. Power in both directions allows the slide to be inched, stopped, or reversed at any point in the stroke, with full tonnage

capacity available as needed. From 25-300 ton capacities with or without die cushions.

23. Micrometers. A new illustrated bulletin giving complete specifications on a line of micrometers imported from England has been issued by De Witt Equipment Corp., Dept. BB, 136 Lafayette St., New York 13, N.Y. Included are precision micrometers, screw pitch micrometers, adjustable micrometers and accessories.

24. Grinder, for grinding cemented carbide tools, is described in bulletin from the Dynatomic Corp., Dept. MTB, 1803 E. Creighton Ave., Ft. Wayne, Ind. Some features claimed: Eliminates diamond wheels; grinds 10 to 20 times faster; rough and finish grinds simultaneously; grinds shank steel and carbide simultaneously; automatic dynamic spindle and wheel balance.

25. Precision Tools. A new 2-color, 34-page catalog (K) has been announced by Erickson Tool Co., 2321 E. Hamilton Ave., Cleveland 14, Ohio, describing complete line of chucks, holders, mandrels, air cylinders, speed indexers, cutting bars and special holding fixtures. Gives specifications on model dimensions and ranges.

26. Counterbores. Standard drive counterbore cutters manufactured by Continental Tool Works, division of Ex-Cell-O Corp., 1212 Oakman Blvd., Detroit 32, Mich., are engaged or released from the holder with a twist of the wrist. Double driving lugs on the shank of the cutter engage double abutments in the socket of the holder for a balanced positive drive. Bulletin 60446 available upon request.

27. Carbide Tool Maintenance. Latest information on the maintenance of cemented carbide tools for the mining industry is included in a manual (CM-121) now obtainable from Carboloy Department of General Electric Co., Dept. BB, Detroit 32, Mich. Outlines basic principles of grinding and describes grinding procedures for cutter and finger bits, roof-bolt and auger drills.

28. Welding Design Manual. "Manual of Design and Welding Engineering" has been published by the Eutectic Welding Alloys Corp., Dept. B, 40-40 172 St., Flushing 58, N.Y., as the result of requests for a small, condensed form of the manual of the same name. Contains detailed instructions for joint design.

29. Cylindrical Gages. New catalog of the Farmington Engineering Co., Dept. BB, 72 Granby St., Bloomfield, Conn., covers their complete line of steel rings, go length members, not go length members, go and not go plug gages, progressive members, long go members, carbide go and not go members, carbide or norbide rings, twin rings and holders, master discs.

30. Hot Die Lubricants produced by Fiske Bros. Refining Co., Dept. B, 129 Lockwood St., Newark 5, N.J., for upsetting, piercing, extruding, forging, die casting, are described in circular distributed by the company. Lubricants are made in various consistencies, permitting selection of the proper grade for requirements.

31. Trigonometry Chart. A 17" x 22" plastic coated wall chart (Trig-Pal), that spells out the equations for any trigonometrical shape, is available from the Alba Engineering Co., Inc., Dept. BB, 5705 S. Alameda St., Los Angeles 58, Calif. Shows the equations to learn the unknown factor when other factors are known. It operates for right angle trig., oblique angle trig., compound trig., and spherical trig.

32. Clutch-Coupling Units. A 4-page bulletin on the new line of Formsprag clutch-coupling units is now available from the manufacturer, Formsprag Co., Dept. B, 23601 Hoover Rd., Van Dyke, Mich. Gives dimensional data, service factors, and other application engineering data necessary to specify the right clutch-coupling unit.

33. Universal Oscillating Grinder. The Gear Grinding Machine Co., Dept. B, 3901 Christopher, Detroit 11, Mich., has announced the availability of a 6-page illustrated catalog on the Geargrind universal oscillating grinder for finishing spherical, conical and cylindrical surfaces.

34. Pumps, Valves. Two condensed catalogs, one covering valves—by-pass, piston type—and the other, centrifugal coolant pumps, are being distributed by the Ful-flo Specialties Co., Inc., Dept. B, Blanchester, Ohio. Folders are well-illustrated with photographs and diagrams.

35. Die-Draulic Grip. The Grand Valley Machine and Tool Co., Dept. BB, 528 Butterworth St. S.W., Grand Rapids, Mich., says that the Barrett Die-Draulic grip is an efficient answer to the problem of holding strip stock in position during forming or drawing. Eliminates springs and air pads. Write for 4-page bulletin.

THIS HELPFUL LITERATURE NOW AVAILABLE

36. Diamond Tools. A leaflet describing Copberyte diamond tools has been issued by the Industrial Diamond Div., Grof Mfg. Co., Dept. B, 703 Citizens Bldg., Cleveland 14, Ohio. Features claimed: beryllium-copper special alloy casting; corrosion resistance; good thermal conductivity; Rockwell hardness 38-44-C scale; yield strength 140,000-170,000; tensile strength 165,000 psi.

37. Adjustable Drill. Bulletin published by the Hayden Twist Drill Co., Dept. MB, 8626 Lyndon Ave., Detroit 38, Mich., gives description and prices of the 1"-2" adjustable drill. Will cut holes from 1" to 2" in dia. with two sets of replaceable blades.

38. Swiss Crafted Tools. The spring issue of Hirschmann Highlights, published by Carl Hirschmann Co., Inc., Dept. BB, 30 Park Ave., Manhasset, N.Y., and describing Swiss type automatic screw machines, milling machines, toolmakers' lathes, burnishing machines, punch forming and shaping machines, profiling machines, and gear-hobbing machines, is available upon request.

39. Dresser for Surface Grinders. Perforated folder covering the Model 32 hydraulic automatic dresser for surface grinders, featuring fast, automatic contour dressing, inclined plane mechanism, sealed against grit and coolant, is obtainable from the Hoglund Engineering & Mfg. Co., Inc., Dept. BB, 343 Snyder Ave., Berkeley Heights, N.J.

40. Thread Comparator Accessories, for standard and special applications, are featured in 8-page folder from the Johnson Gage Co., Dept. MTB, Bloomfield, Conn. With the company's products, checking for concentricity and squareness is generally accomplished by assembling standard accessories to a standard comparator, and adding, if necessary, special adaptors.

41. Threading Heads. The Landis Machine Co., Dept. B, Waynesboro, Pa., has recently revised its solid adjustable threading head bulletin (F-78-3), which includes detailed data on all Landis solid adjustable heads. Heads feature tangential chasers and cover a pipe range from $\frac{1}{8}$ " to 6".

42. Cylindrical Grinders. A new edition of the 28-page general catalog of Landis precision cylindrical grinders is now available. Illustrated are universal, plain, roll, centerless and special purpose grinders for cranks, cams, pistons, valves and similar parts. Included are a brief description and specifications for each machine. Landis Tool Co., Dept. MB, Waynesboro, Pa.

43. Jig and Fixture Components. An 86-page catalog describing and illustrating their recently expanded line of standard jig and fixture components has been issued by Lodding Inc., Dept. N67, 79 Beacon St., Worcester 1, Mass. Shown are full-scale layouts of every Lodding fixture. New products include plain fixture keys, heavy duty jacks, and ductile iron bar knobs and speed handles.

44. Non-metallic Tape. A circular featuring the Hi-line non-metallic woven tape has been released by the Lufkin Rule Co., 1734 Hess St., Saginaw, Mich. Tape is said to have good dimensional stability, even after soakings. Markings are protected by coatings of plastic that is resistant to abrasion, cracking, mildew, moisture, temperature changes.

45. Material Handling. Booklet No. 4 of the Library of Know-How, the Material Handling Institute, Inc., Dept. BB, 813 Clark Bldg., Pittsburgh 22, Pa., is ready. The relation of material handling to the engineering, operating, and training functions is detailed. Manual is designed to give material handling engineers a guidebook and to provide teachers and students with better instruction and study material. Price 50 cents.

46. Centerless Grinders, for bars and tubes, are detailed in flyer being distributed by Mattson Machinery, Inc., Dept. MB, 19 Greenwood Ave., Montclair, N.J., representative for the Lidköping grinders. Features include: double-sided bearing of grinding and regulating wheels; grinding wheel spindle relief of belt tension; adjustability of both wheels in relation to the work; double-sided suspension of the regulating wheel headstock.

47. Air Power. The 52-page industrial air power catalog just issued by Mead Spe-

SENT FREE UPON RETURN OF POSTAL CARD

cialties Co., Catalog Dept. 6, 4114 N. Knox Ave., Chicago 41, Ill., lists new products suitable for use in forming automatic or semi-automatic production machines. Included are: air cylinders, air clamps, workfeeders, vises, collets, drill press feeds, column presses, timers, etc.

48. Abrasive and Cutting Tools. An abrasive and cutting tool catalog is ready for distribution by the Metal Removal Co., Dept. BB, 1546 N. Orleans, Chicago 10, Ill. Within the 40 pages are charts suggesting abrasive grain selection and grade recommendations for specific jobs, as well as safe operating speeds for wheel diameters and tool overhang.

49. Wrench Holder, for hex socket head screws and nuts, is described in circular from the Micro Tool Co., Dept. MTB, 10 Sigourney St., Hartford 5, Conn. Tool converts four finger tools into a combination hand tool with four wrenches projecting from the top in different directions. No interference with machinery or other tools.

50. Facing Heads. The Mummert-Dixon Co., 122 Philadelphia St., Hanover, Pa., has available a leaflet describing its facing heads with automatic feed, made for one-way and two-way tool feeds. Features convenient tool adjustment and quick feed reverse. The head with its

feeding arrangement is self-contained, needing no external contact to operate the feed.

51. Layout and Inspection Fixture. The new Sorensen Roto-Mike precision layout and inspection fixture, product of Sorensen Center-Mikes, Inc., 261 Kosuth St., Bridgeport 8, Conn., combines the advantages both of vernier protractor and sine plate. Fixture is sufficiently rigid and rugged to be used also as a work support in milling and boring operations. Literature available from company.

52. Press Brake, Roller. Two bulletins issued by O'Neil-Irwin Mfg. Co., 410 8th Ave., Lake City, Minn., cover, respectively, the hand operated Di-Acro press brake and the Di-Acro roller. Press brake is useful in model shops, experimental laboratories and production departments where a limited quantity of parts must be accurately produced. A cam actuated idler roll, said to be an exclusive feature of the Di-Acro roller, makes it possible to form circles in sheet material in two passes through the rolls.

53. Screw Machine. Both the front and back ends of work pieces can be machined in a single cycle with the Double-Matic automatic single spindle screw machine, manufactured by Porter-McLeod

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READERS' SERVICE DIVISION

WHEATON, ILLINOIS

Machine Tool Co., Inc., Dept. B, Hatfield, Mass. Claims to save a minimum of 50 per cent on work requiring second operations. Folder describing machine is obtainable from the company.

54. "Facts About Stampings," a 32-page illustrated book issued by the Pressed Metal Institute, Dept. FPR-BB, 2860 E. 130th St., Cleveland 20, Ohio, has been reprinted. Included in the subjects covered are: holes, flanges, flanges and radii, layout, notches and slots, gage inspection, tolerances, steel gages, etc. Price 50 cents. Write on company letterhead.

55. Precision Tools. Five booklets have been issued by the R. B. Tool Co., Inc., Dept. B, 785 N. Broaday, White Plains, N.Y. Catalog No. 101 presents internal cutting tools in four styles, for boring, facing and bottoming, threading and recessing. Catalog No. 102 covers tool sets for jig-borers. Catalog No. 103 describes the Type ST spring and swivel holder for threading tools. Catalog No. 104 illustrates boring bars with half-elliptical carbide bits. Catalog No. 105 relates features of the Type FN cutting-off tool with adjustable spring action. Catalog No. 106 features boring bar holders with adjustable center height.

56. Grinding Discs, Cut-Off Wheels. Bulletin No. 6901-E, Manhattan Rubber Div., Raybestos-Manhattan, Inc., 61 Willet St., Passaic, N.J., describes Manhattan Mol-

discs, for portable grinders and sanders. Bulletin No. 6750 covers cut-off wheels, and includes recommendations with wheel grade numbers for a wide variety of materials. Bulletin No. 6649 features reinforced foundry cut-off wheels.

57. Saw Blades. An informative, 4-page brochure telling about the new radialloy-tipped circular saw blades, for cutting woods, plastics, composition materials, nonferrous metals, has been made available by Radial Cutter Mfg. Corp., Dept. MB, 331 Bond St., Elizabeth 4, N.J. Features: heat-treated, precision-ground steel blade which avoids vibrations; carbide tips with full steel backing and a special safety lock.

58. Gages. Two catalogs of Reliant Industries, Dept. B, 4947 Firestone Blvd., South Gate, Calif., present their gages, with illustrations and specifications. Catalog 54A features dial indicator gages for the inspection of 0 ring grooves from $23/64''$ to $4\frac{1}{8}''$ dia. Catalog 54E covers their fully adjustable indicating snap gage. Only two sizes cover a $0''$ to $6''$ range.

59. Hydraulic Valves. The new line of Rivett sub-plate mounted, solenoid operated hydraulic valves is described in Catalog No. 260 published by Rivett Lathe & Grinder, Inc., Dept. MTBD, 18 Riverview Rd., Brighton 35, Boston, Mass. Diagrams show flow operations under all

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MACHINE and TOOL BLUE BOOK AUGUST, 1954

Please send the literature which I have encircled below:

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35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
69	70	71	72	73	74	75										

NAME..... POSITION.....

COMPANY.....

STREET.....

CITY..... ZONE..... STATE.....

types of action for each of the 14 piston designs in which the new valve is offered.

60. Filing, Storing System. The Multiroll file, an orderly system for filing, storing, segregating tracings, drill rods, blue prints, glass tubing, sheet material, is described in flyer issued by Roll & File Systems, Inc., Dept. B, P.O. Box 85, Ferndale 20, Mich. Can be obtained in 49- or 25-tube models. Each file is constructed in a square arrangement and encased in a 200 lb.-test reinforced corrugated

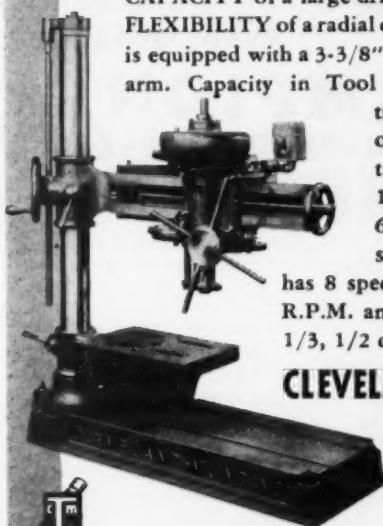
board container. Rolling tube and index forms furnished with each unit.

61. Centrifugal Pump. Model D-501, a direct connected compact motor driven Rumaco centrifugal pump recently developed by the Ruthman Machinery Co., Dept. BB, 1809 Reading Rd., Cincinnati 2, Ohio, is described in a bulletin from the manufacturer. New pump covers a wider field than the company's Gusher coolant pump, but does not replace it.

HOW TO MAKE PROFITS FROM SMALL HOLE DRILLING!

CLEVELAND-MUNDING BENCH RADIAL DRILL combines the CONVENIENCE and ACCURACY of a sensitive drill and the RANGE and CAPACITY of a large drill with the SPEED and FLEXIBILITY of a radial drill. The Bench Radial is equipped with a 3-3/8" dia. column, has a 24" arm. Capacity in Tool Steel—1/2". Vertical

travel of arm on column of 25" and horizontal travel of head on arm of 18". Spindle travel of 6-1/8" and #2 M.T. in spindle. The spindle has 8 speeds from 160 to 3140 R.P.M. and is equipped with a 1/3, 1/2 or 3/4 HP Motor.



CLEVELAND-MUNDING BENCH RADIAL DRILL

*Write today for
Folder No. BB-84*

CLEVELAND
tapping machine co.

A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC. • CANTON 6, OHIO

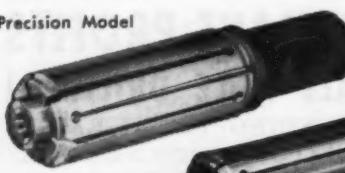


62. Power Presses, Hack Saws. Attractive literature featuring Press-Rite open back inclinable power presses is being distributed by Sales Service Machine Tool Co., 2357 University Ave., St. Paul 4, Minn. Built-in capacities 5 to 85 tons inclusive. Frame is reinforced at all vital points. Also available is folder illustrating the ten models of Keller power hack saws. The smallest unit, $\frac{1}{4}$ hp motor, has capacity $3\frac{1}{2}'' \times 3\frac{1}{2}''$ with 150 strokes per minute. Largest unit is driven by a 1 hp motor, has capacity $9'' \times 9''$, with either 80 or 140 strokes per minute.

63. Floating Holders. Scully-Jones and Co., Dept. MB, 1901 S. Rockwell St., Chicago, Ill., have recently published a catalog on their new JT lock and eject collet type floating holders, which compensate for misalignment between tool and work on drilling, reaming and tapping jobs. Holders are designed with separate floating and driving elements.

64. Flushpin Blocks. Folder and catalog are obtainable from Schaefer Gages, Dept. BB, 39 Hale St. Ext., Rockville, Conn., featuring their standard flushpin

Precision Model



Standard Model



makes
the Solid
Arbor obsolete

CHAMPION E-X-P-A-N-D-I-N-G MANDRELS

The expanding sleeve, mounted on tapered arbor, expands automatically to fit the hole. Inserted by hand — no arbor press needed. Always an exact, positive, concentric fit. Locked by a single mallet blow. Unlocked the same way. CHAMPION Expanding Mandrels are used in machine shops around the world. Save time, cut production costs, whether the job calls for machining one piece or a thousand.

Precision Model has expansion range of $.010''$. Available in regular sizes to fit holes from $\frac{1}{2}''$ to $3''$ diam. Holds work to tolerances of $.0002''$ run-out. Guaranteed for precision grinding, turning and milling operations.

Standard Model maintains close tolerances, handles material of any length bore, hard or soft metals — from thin tubes and bushings to heavy castings and forgings. A set of fourteen will fit every hole from $\frac{1}{2}''$ to $9\frac{1}{2}''$ diam.

CHAMPION Expanding Mandrels can be made in special shapes and sizes to fit any specifications. Quotations on request. Write for descriptive folder today.

WESTERN TOOL & MFG. CO., INC.
Our 53rd Year • Dept. 27 • Springfield, Ohio

blocks. Block is complete, ready for the tool maker to assemble to flushpin gage—drill and tap for screws, spot drill and ream for dowel pins, grind tolerance step required, and gage is finished.

65. **Basket Guard for Punch Presses.** Circular sheet presenting the Searjeant adjustable basket guard for punch presses is being distributed by Searjeant Metal Products, Inc., Dept. BBH, Mendon, N.Y. Guard has been designed for all press room conditions when strip or bar stock is fed into presses for blanking, cut-off, notching, multi-operation work, etc.

66. **Gage Selector, Direct Reading Ramp Gages.** Selection of proper pitch diameters for all American or Unified thread plug or ring gages is made easy by Sheffield's new slide rule gage selector. Available upon request from Sheffield Corp., Gage Div., 721 Blue St., Dayton 1, Ohio. An illustrated 58-page brochure covering the use and care of direct reading ramp gages for the critical analysis of compressed gas cylinders and fittings is also being distributed by the company.

67. **Drill Jigs, Fixture Clamps.** A new piece of literature briefly outlining

N EED CARBIDE-TIPPED REAMERS *=in a hurry?* Staples can give —

48-HOUR DELIVERY

on special reamers that are slight alterations of standard sizes

IMMEDIATE DELIVERY

on standard sizes of expansion reamers—and solid reamers with straight and spiral flutes

Phone, wire or write for complete information!

Standardize on Staples Carbide-Tipped Circular Tools—you'll get longer tool life, greater accuracy, and spend less time on tool servicing. Staples is the quality name in carbide tool production. If you require special tools, Staples welcomes the opportunity to help you get the utmost in precision hole production. Tell us your requirements.

THE STAPLES TOOL COMPANY • Cincinnati 25, Ohio

Staples CARBIDE-TIPPED CUTTING TOOLS

A complete line of Circular Carbide-Tipped Tools, Expansion Reamers—Special Tools

Siewek drill jigs, fixture clamps, and fixture details, and showing new additions to the line, has been released by Siewek Tool Co., Dept. MTB, 2860 E. Grand Blvd., Detroit 2, Mich.

68. Ring Gages. The Size Control Co., 2502 W. Washington Blvd., Chicago 12, Ill., is distributing a leaflet describing Boremaster ring gages designed for setting dial bores and other types of inside measuring devices. Also shown, reversible plain and thread plug gages and AGD plain ring gages. Ask for Boremaster literature.

69. Small Business. Several new booklets have been released by the Small Business Administration, Washington 25, D.C.: (1) The Small Manufacturer and His Specialized Staff, price 20 cents; (2) Sales Forecasting for Small Business; (3) Appraise Your Competitive Position to Improve Company Planning; (4) Getting your Product on a Qualified Products List; (5) Essentials of Good Plant Lubrication.

70. Lathes, Drill Presses, Shapers, Pedestal Grinders, products of South Bend Lathe Works, 425 E. Madison St., South



NEW AUTOMATIC BAR FEED ATTACHMENT

Kalamazoo's new Bar Feed Attachment for Models 816, 824, 8C and 1220 Kalamazoo Metal Cutting Band Saws converts them to completely automatic cut-off machines. Combines low cost with high production and labor savings.

Kalamatic is a completely hydraulic self-contained unit which opens saw frame to correct height, opens vise, feeds stock to correct length, clamps vise and lowers

frame at controlled rate — all automatically. Eliminates operator fatigue, increases blade life.

Feeds rounds, flats, square, hex, pipe, tubing, etc., any length from $\frac{1}{8}$ " to 12", or longer if required.

Ask your dealer for a demonstration or write for descriptive material and name of your nearest dealer.

MACHINE TOOL DIV. *Kalamazoo TANK and SILO CO.*

832 HARRISON STREET • KALAMAZOO, MICHIGAN

Bend, Ind., are presented in Catalog 5406, now available from the company. Each machine is well illustrated and described completely. Catalog includes diagrammed section giving floor space required for the various machine tools.

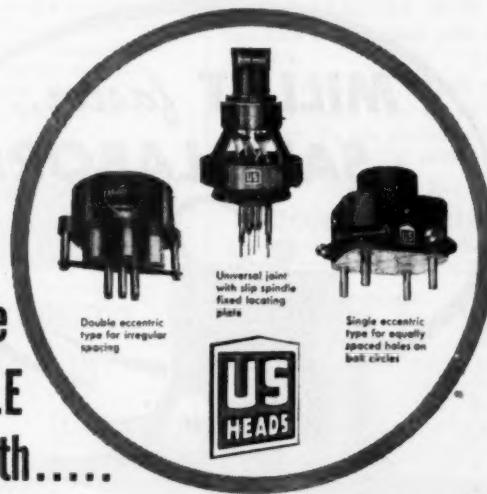
71. Brake Motor. Literature on the Dina-brake, for controlled stopping of a.c. motors, is available from the Standard Dayton Corp., Dept. BB, P.O. Box 1001, Dayton 1, Ohio. Included is text of address presented by Samuel Noodlemen, manager, Standard Electric Div., Standard Dayton Corp., at the sixth annual

AIEE conference on machine tools, entitled "The A.C. Dynamic Brake Motor."

72. Single Spindle Automatic. The 2½" Model AW, the Cleveland Automatic Machine Co., Dept. B, Cincinnati 12, Ohio, features Geneva turret index, increased spindle speed range, reduced idle motion, air operated spindle head clutch, hand crank stock feed adjustment. Bulletin available from manufacturer.

73. Carbide Reamer Sharpening. A shop manual has been issued by the Staples

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Truth.....



Machine tool men "in the know" have long acclaimed the "US" Adjustable Multiple Spindle Drill Heads with their quick-change universal joint assemblies. They are built for continuous use, with full anti-friction bearing construction for high capacity thrust loads. The universal joint adjustable multiple spindle type is suitable for any sensitive drilling machine. Joints are self-lubricating.

The single eccentric type is used for equally spaced holes on bolt circles.

The new double eccentric AdjUstatix, two to eight spindles, permits spindles to be located in non-symmetrical patterns. It eliminates expensive change in set-up.

Write for details on any type of universal joint adjustable head. Ask also about our totally enclosed gear-driven adjustable, fixed center, or individual lead screw tapping heads.

UNITED STATES DRILL HEAD CO., 616-618 Burns St., Cincinnati 4, Ohio

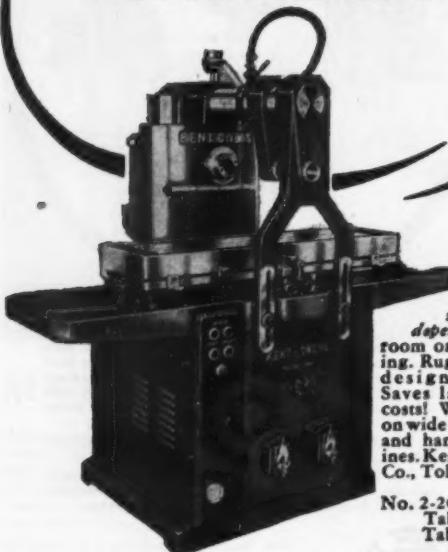
Tool Co., Dept. BB, Cincinnati 25, Ohio, to provide users of carbide-tipped reamers with data on carbide reamer sharpening and tool conditioning. Included is information on chamfer sizes, recommended clearance angles, method of repairing o.d.'s and flute faces and special sharpening techniques for specific applications.

74. **Fixture Key.** A new type of fixture key featuring the elimination of milled keyways is described in literature available from the Standard Parts Co., Dept. B, 1000 Broadway, Bedford, Ohio. Two drilled and reamed $\frac{5}{8}$ " holes in the fix-

ture make all keys instantly interchangeable. This assures adaptability of the fixture to any available milling machine by inserting keys according to the size of the table slots.

75. "Stoolcraft" is the title of a gaily illustrated 12-page booklet issued by the Standard Pressed Steel Co., Box 606, Jenkintown, Pa., which discusses the art of sitting down on the job in industry. Woven into the engaging text are descriptions of the various SPS seating arrangements, their sizes, materials and features.

**MILL IT faster..
SAVE LABOR!**



Kent-Owens advanced features mean speed, accuracy and dependability... in tool room or production milling. Rugged... simple in design and operation. Saves labor... reduces costs! Write for bulletins on wide range of hydraulic and hand-operated machines. Kent-Owens Machine Co., Toledo, Ohio.

No. 2-20 Milling Machine
Table, 42" x 12"
Table travel, 20"

KENT-OWENS
Milling Machines

(Continued from page 290)

Electromill, according to W. B. Knight Machinery Co., Dept. BB, 3920 W. Pine Blvd., St. Louis 8, Mo.

Many design features incorporated into the Electromill, plus unusually heavy and strong construction for a machine of this size, claim precision, versatility and speed.

All controls are located in a single panel that can be moved to the most convenient position—front, back or to entire side. Variable speeds motors, equipped with "Thymotrol" control, offer a complete range of infinitely variable speeds and feeds.

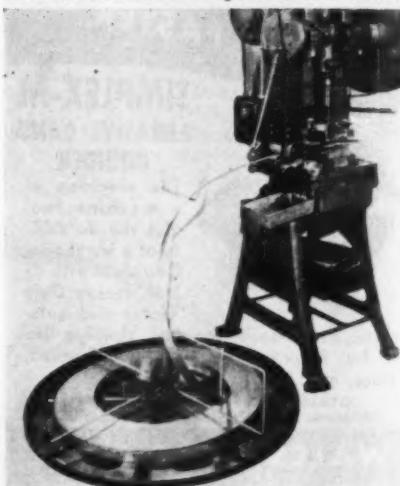
The column and spindle head, and extra long quill, give the Electromill a full 35" of throat capacity. Large work can be completed with only one setting.

Use ACTION Card, opposite page 64. Encircle No. 23

Jaco automatic stock reel

A new base for the 24" Jaco automatic stock reel changes the angle of feed and allows the reel to take full advantage of the natural spring of the uncoiling stock. Reel is powered entirely by the spring of the uncoiling stock, without use of motors, belts or sprockets; it is fully automatic.

The loop of stock between the coil and the press feed is said to completely eliminate slippage, kick-back and overrun. It supplies stock from the coil to the feed at whatever speed is established



How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

SLEEVES MADE IN FOLLOWING SIZES:
3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

STURDY BROACHING SERVICE
23516 TELEGRAPH ROAD

DETROIT 19, MICH.



Write for
Literature

by the feed. Available in three sizes, 24", 30" and 36" platen, the Jaco reel will operate with almost any type of coiled stock which fits the platen and weighs no more than 250 lbs. Jaco Devices, Inc., Dept. B, 99 High St., Hingham, Mass.

Use ACTION Card, opposite page 64. Encircle No. 24

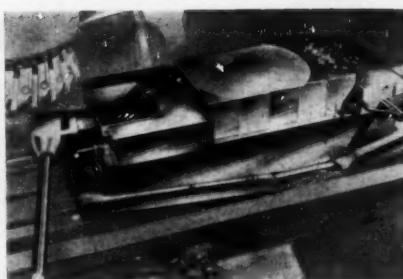
New milling machine vise

A new milling machine vise is announced by J & S Tool Co., Inc., Dept. B, Livingston, N.J.

A swivel vise without the pedestal, it is claimed to be low, light and roomy. Made of cast steel, hardened and ground.

The new vise opens to a distance of 12". A trigger stop enables an operator to open and close the vise to a desired position in about one second. No turning of the handle is required in this operation; it is necessary only to lift the trigger stop and either push or pull the movable jaw of the vise into position. A detachable knuckle handle 18" in length permits selective tightening positions of the handle every 30°. The extra length of the handle gives it unusual leverage and discourages the need of hammering the handle when tightening the vise.

A feature of the vise is its unique downholding clamping action. The jaw



of the vise travels straight in and down and locks the workpiece horizontally against the opposite jaw, and downward against the table. Lead hammering is unnecessary.

Use ACTION Card, opposite page 64. Encircle No. 25

Desk model lathe

A versatile production lathe—The Elgin desk model—has been added to the Elgin standard line of precision machine tools. This unit provides a desk high bed and spindle for the convenience of women operators, plus an operating lever and pedals placed for fast and easy action.

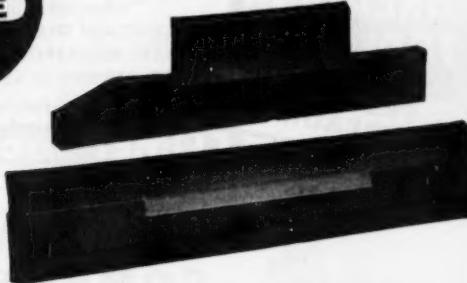
Providing for instant spindle run-stop and collet position control, it is said to be



Standard thrufeed and in-feed work support blades available from stock. Prices on special blades quoted on receipt of prints.

SPECIAL TOOLS — Prompt quotes on receipt of prints

CARBIDE TIPPED Work Support Blades for CENTERLESS GRINDERS



WILLEY'S CARBIDE TOOL CO.

SOLE MAKERS OF WILLEY'S METAL

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Detroit 1, Michigan

Specify DESTACO FEELER STOCK

For precision fitting, checking clearances, inspection and production work. Available in 12" strips, $\frac{1}{2}$ " wide, in cellophane, packed 12 pieces of one thickness to a box, also in 25-foot coils. 14 standard thicknesses from .0015" to .015".

DETROIT STAMPING COMPANY
347 MIDLAND AVENUE • DETROIT 3, MICHIGAN

SPECIFICATIONS

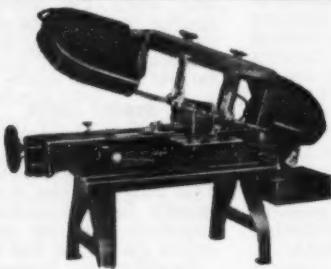
Size 9" x 16"

Blade Size $\frac{1}{4}$ " x .032x
11/16"

Floor Space 20" x 60"
Blade Travel 60, 90
and 120 ft. per
minute

Swivel Vise 45 de-
gress in either
direction

Wt. Aprx. 500 lbs.



For BIG Savings at little cost

. . . Investigate this new Model H hinge-type saw, the economy model in W. F. Wells & Sons' line of metal cutting equipment. One-piece frame lowers hydraulically. Coolant system and other accessories available. Send for literature today.

W. F. WELLS & SONS
THREE RIVERS, MICHIGAN

**INTERNAL
THREADING
TOOLS**

for PRECISION
THREADING

FOR HOLES FROM 1/16" UPWARD
17 DIFFERENT SIZES

MADE OF SUPER-HIGH-SPEED
STEEL SPECIALLY TREATED

(Available in Carbide)

- CONSTANT SHAPE AND CLEARANCE
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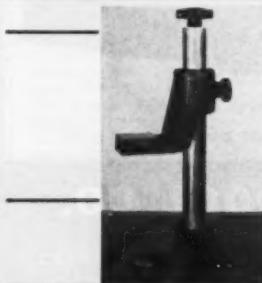
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COMET Tool Co.



Dealers! Here's
a Profit-Maker!

738-MT Broadway,
New York 3, N. Y.

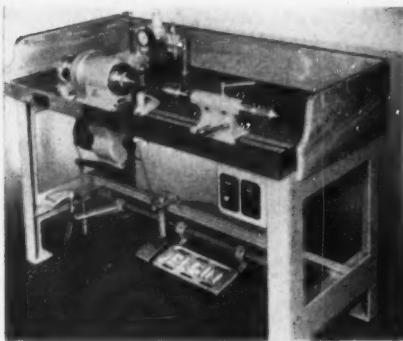


New **ZERO-ZERO COMPARATOR GAGE**

For Accurately Constructing and Inspecting
Jigs, Fixtures, Gages, Dies, and Machine Parts

For further details write

GARREAU & CO. 351 THAMES ST.
NEWPORT, R.I.



an ideal machine for short turning, facing, crimping, etc. operations.

It is made in two models, the 4 P 7 with a $\frac{3}{4}$ " draw-in type collet and the $1\frac{1}{16}$ " stationary type collet. It has a 7" swing, 15" between centers, speeds to 4,000 rpm and may be equipped with compound slide rest, double cross slide, 6-hole turret and other standard bench lathe accessories, Elgin Tool Works, Inc., Dept. B, 1770 Berteau Ave., Chicago 13, Ill.

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Natural or Calcined
Fuller's Earth 10-44
mesh

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228 N. LaSalle St. Chicago 1, Ill.

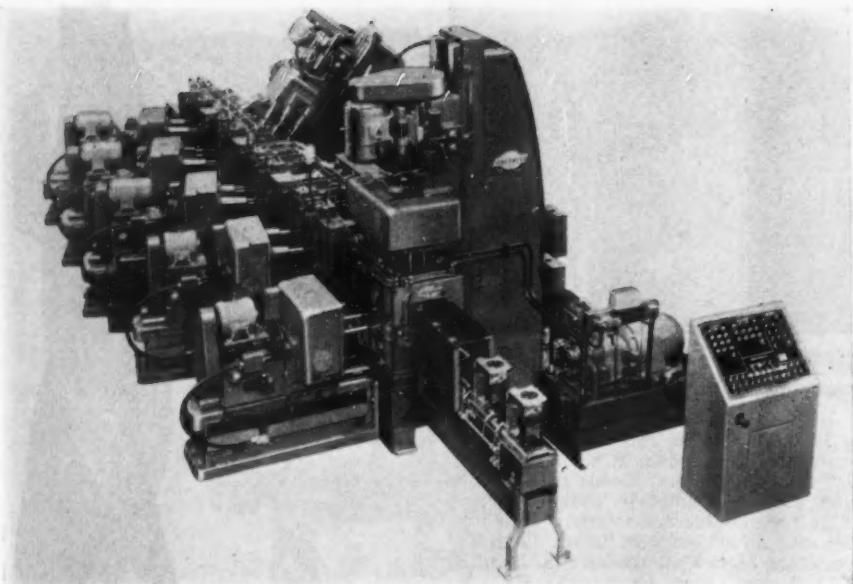


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3801 Buchanan S.W.
Grand Rapids 8, Michigan





Automatic production line of 4 transfer machines built by Greenlee

A new automatic production line of four transfer machines has been designed and built by Greenlee Bros. & Co., Dept. MB, Rockford, Ill., for machining automotive transmission cases. All four transfer machines combine the facilities of 247 tools to complete 265 operations in 29.5 seconds, averaging 122 cases per hour at 100 percent efficiency. The 17-station transfer machine shown in the photograph is the second machine in the line. It performs drilling and reaming operations on the bottom, top, and end of the transmission cases.

Outstanding features of these machines are the safety devices for the protection of the operating personnel and the machine. Steel mesh guards are provided on and between each working station and are hinged to allow easy access to the transmission cases for inspection and removal. All guards are electrically interlocked, permitting the machine to run only when all the guards are locked down. Each machine is equipped with an easy-to-reach emergency cord for stopping the machine from any position along its entire length. All functions of the machines are hydraulically operated

and electrically interlocked and any malfunction is readily detected and the trouble located immediately by a system of lights mounted on the operator's control cabinet.

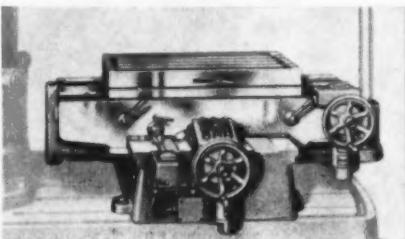
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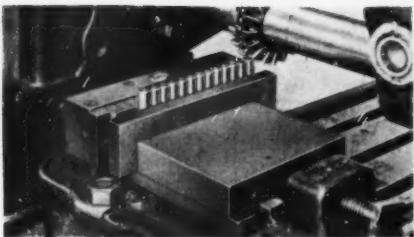
Fosdick automatic positioner available

The Fosdick Machine Tool Co., Dept. B, Cincinnati 23, Ohio, has announced a new automatic positioning table for use with radial drills.

The Fosdick automatic positioner has been in use for over four years on Fosdick jig borers and automatic positioning machines. It is claimed to have boosted production as much as 250% on production jobs. Now it is available as a separate unit.

The positioner gives exact reproduction





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Equalizing JAWS or FIXTURES

For... the modern solution to the old problem of machining multiple pieces at one time, both milling and grinding, the Dery vise jaws or fixtures will handle pieces with varied diameters as well as varied lengths.

Loading slides can be made to load while milling. Send us a sample of the work to be machined or blueprints for a quotation.

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Pine Meadow • Connecticut



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REPORT
on the advantages of
NORTH MISSISSIPPI

for new and expanding industries in the MACHINERY AND FABRICATED METAL PRODUCTS FIELDS. For a free copy of this new, 40-page illustrated report, write on your letterhead to:

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West Point, Mississippi P. O. Box 337G
Harry W. Clark, Executive Director

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*Looking for
a WIDER SELECTION?*

ACE has just what you are looking for — the finest Drill Bushings ever made! Now over 22,000 A.S.A. and other standard sizes plus specials.

Also hexagon, knurled or serrated bushings for use in soft or castable materials.

Always Specify Ace!

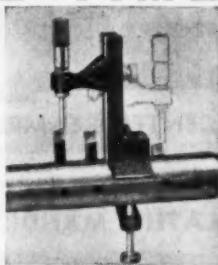


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5407 FOUNTAIN AVENUE
LOS ANGELES 29, CALIF.

SAVE TIME

WITH
BARTELT
GAGES



Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to fixed base. Make settings in one step—eliminate cut-and-try methods. Model B, with reversible slide, shown. Write for literature describing all models.

BARTELT ENGINEERING CO.

1218 Partridge Ave.
Beloit Wisconsin



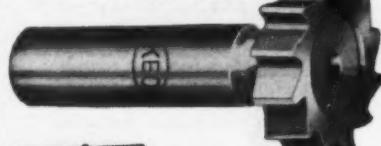
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CENTER DRILLS



Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

KEYSEAT CUTTERS



High speed. Right hand $\frac{1}{2}$ " shank. Diameter from $\frac{1}{4}$ " to $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.



CENTER REAMERS

High speed steel. Reamers from $\frac{1}{4}$ " to 1" regularly turned with 60°, 82°, 90° included angle. Specials made for your specifications.

LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from $\frac{8}{16}$ " to 1" are .0005" undersize at small end, from $1\frac{1}{8}$ " to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

of precision drilled, bored, tapped and reamed parts, without jigs or setting stop adjustments. Positioning of work is done automatically at the touch of a button, accurate to $\pm .0001$ ", with two duplicating bars.

The automatic positioner can be very easily installed for use with existing rigid, radial equipment. Rigidity, true-running spindle are, of course, essential to get fine precision.

Use ACTION Card, opposite page 64. Encircle No. 28

Furnas Electric push button stations

Furnas Electric push button units are available in a wide range of combinations that are claimed to fit into most manufacturers' equipment requiring push buttons; feature easy wiring, dependable operation, attractive appearance, flexibility of mounting, compact enclosures.

All units are interchangeable, being of the same size, and can be front or back mounted. They are individual, and not grouped in blocks. The units are of



molded thermal setting plastic.

Pilot lights, selector switches and push buttons are available in control stations and pendant stations in any combination. Furnas Electric Co., Dept. MB, 1046 McKee Street, Batavia, Ill.

Use ACTION Card, opposite page 64. Encircle No. 29

Grinding, checking fixture

The DeSoto Tool Company of Hazel Park, Mich., has announced a new tool that is said to make it easy to grind and check tools, gages and similar parts requiring small, exacting, close-tolerance radii. The fixture grinds all angles from



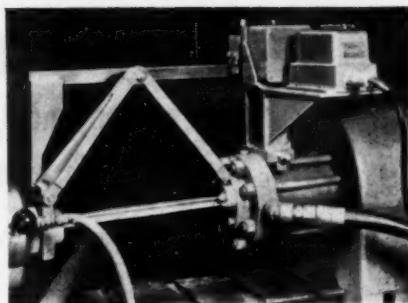
0° to a full 180° and radii as small as .001" upwards, to tolerances as close as .0001".

All the mechanic has to do is set up the fixture for the result he wants, much in the same way a calculating machine does its job for the accountant, once he has

set the machine with the proper factors. The DeSoto Tool Co., Dept. B, 2250 East Nine Mile Road, Hazel Park, Mich.
Use ACTION Card, opposite page 64. Enclosure No. 30

Electronic counter overcomes effect of hardness variations in stretch-wrap forming

Work hardened material is frequently encountered in stretch forming where the stock receives a final stretch (equal to a certain percentage of its total length) to "set" the contour. Since degree of



Beloit

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ABOVE:
No. 14 single back geared
sliproll, floor model with
capacity of 14 ga. 31
other models to meet every
need.

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Operates to full rated capacity
by hand or by power! Compact
and heavy duty for years
and years of hard usage. The
two feed rolls, geared together,
assure positive feed on even the thinnest material.
The third roll is idle but can
be made for gear drive at
nominal cost. Completed work
is easily and quickly removed.
Made in bench and floor
models, single and double
back.

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WHITTEMORE CO.
100 Blackhawk Blvd. Beloit, Wis.



stretch has in the past been controlled by the pressure exerted, a different length of stretch can be produced each time the hardness of the material varies. The problem is particularly aggravated when forming those metals which are high sensitive to word-hardening in the rolling mills and subsequent forming operations, such as stainless steel.

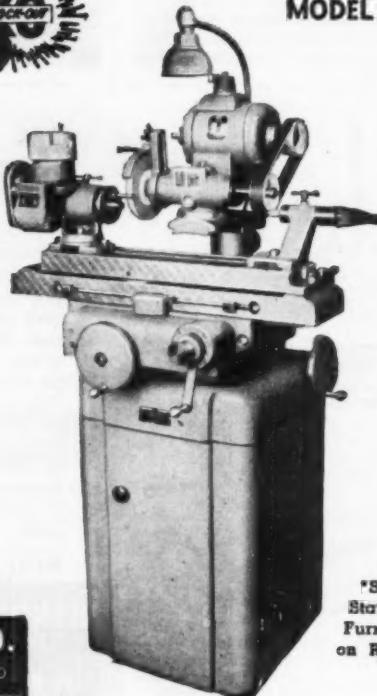
In order to overcome these obstacles a new system of controlling amount of stretch has been developed for use on the Hufford stretch-wrap forming ma-

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sold in 1953 were "Knock-Outs"



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machines
costing 2 or 3
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will do . . .
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chines by Hufford Machine Works, Inc., Dept. B, 1700 E. Grand Ave., El Segundo, Calif.

The elongation produced to set the contours is no longer proportional to the pressure applied; in fact a pressure greater than the actual amount needed is now applied to the workpiece. However, tension is curtailed when a desired lineal increase in work length has been produced.

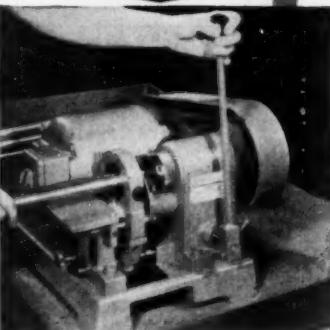
The mechanism is relatively simple, employing two electronic counters. Attached to each tension cylinder of the

Model A-5 Hufford stretch-wrap forming machine is a mechanical device which measures jaw retraction. This consists of a disk marked with a series of alternate black and white lines radiating from the center. The disk is rotated by contact with the sliding arm attached to the jaw. Each 1/10th inch of ram travel causes one white line on the disk to pass an aperture. A light beam reflected by each white line is picked up by a photo cell and converted to an electrical impulse. Thus a series of single electric impulses is trans-

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TUBE DEBURRING

- CHAMFERING
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PINES
No. 600



The Pines No. 600 End-Finishing Machine is designed for fast, accurate work. Women operators commonly debur up to 800—1" tube ends per hour. Exclusive operating features include single lever control which clamps and feeds work to rotating cutters in one pass, enabling operator to have one hand free for stock handling. Small and compact, the Pines machine is equipped with quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, and grease-sealed precision bearings. The No. 600 unit illustrated, handles stock diameters up to 2". Maximum feed stroke is 1 1/4". Automatic air-operated units are also available for higher production work, and larger models for stock sizes up to 5".

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Specialists in Tube Fabricating Machinery 698 WALNUT • AURORA, ILLINOIS

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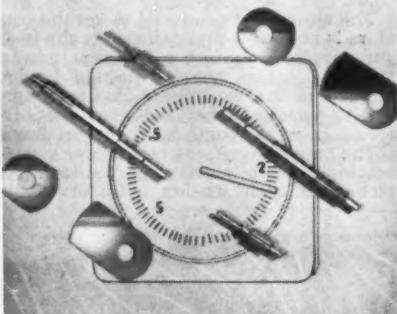
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GROB
BROTHERS

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Goodby TO SPINDLE MISALIGNMENT!



On tapping and reaming jobs you'll find that aligning the spindle with the work is made unusually simple if you use a Ziegler Floating Tool Holder — because the Ziegler automatically compensates for inaccuracies of as much as 1/32" radius or 1/16" diameter.

Get a Ziegler Holder and say goodbye to spindle misalignment troubles forever!

W. M. ZIEGLER COMPANY
13570 Auburn, Detroit 23, Mich.

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Ziegler
ROLLER DRIVE

FLOATING HOLDER
for Taps and Reamers...

mitted from each arm to its respective electronic counter.

The desired stretch is "punched" on the electronic counter keyboards in inches and tenths. When this total is counted off, the stretch is automatically halted.

Hardness variations no longer influence amount of stretch since sufficient pull is applied to exceed the resistance even of the hardest piece encountered. Uniformity of lineal stretch is thus insured from one job release to the next regardless of source of material supply or

other factors out of control of the processor.

Use ACTION Card, opposite page 64. Encircle No. 31

Cold welds by "plier" action

The Utica Drop Forge & Tool Corp., Dept. B, Utica 4, N.Y., has announced the Utica KB-14 and KB-14B butt-weld tools that are said to butt-weld different sizes of same or dissimilar nonferrous metals together without the use of heat, electricity or chemicals.

The tools are plier action operated. They weigh five pounds and are 14" in length.

The KB-14B tool will Koldweld butt-

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We welcome your pump problems and inquiries. Brady specializes in the design and manufacture of small Centrifugal Pumps... used as original equipment by leading manufacturers in Air Conditioning, Refrigeration, Dairy, Machine Tool and many other Industries.



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CUT COSTS with ALLEN Punch Press

1-Ton Power Bench Type.

Powerful, Dependable, Economical.

For light work—stamping, forming, riveting, etc.—metal, fiber or other material.

Overall height 17 $\frac{1}{2}$ " . . . Base size 8 $\frac{1}{2}$ "x8 $\frac{1}{2}$ " . . . Die Bed 8 $\frac{1}{2}$ "x8 $\frac{1}{2}$ " . . . Ram face 1 $\frac{1}{2}$ "x3 $\frac{1}{2}$ " . . . Ram Stroke 3 $\frac{1}{2}$ " . . . positive $\frac{1}{4}$ " ram adjustment . . . sturdy, single pin, non-repeat hand lever clutch . . . V-belt drive . . . weight 105 lbs. Requires only $\frac{1}{2}$ to $\frac{1}{2}$ H.P. motor.

The machine of a thousand uses! Adequate for many types of work now done on large presses at greater expense.

30-Day Money-Back Guarantee. Order TODAY. Price \$97.50 F.O.B. Clinton, Mo. (Includes Motor bracket, V-belt, motor pulley, less motor).

ALVA F. ALLEN,

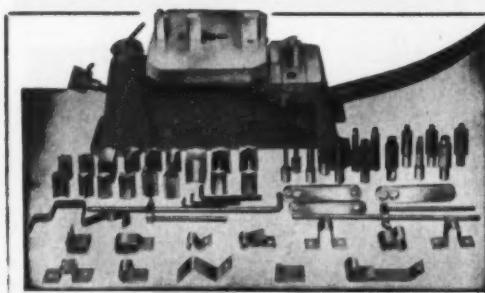
Dept. MTB, Clinton, Mo.

WALTHAM CYLINDRICAL SUB-PRESSES

Dies for high precision work should not only be perfectly aligned but provision should be made to maintain that alignment throughout the life of the die. Our bulletin shows how it can be done.

ARCH SUB-PRESS

WALTHAM MACHINE WORKS WALTHAM 54, MASS.



Multiform BENDER-CUTTER

CUTS, BENDS, PUNCHES

Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend and cut round or flat brass, bronze, aluminum, steel, etc., up to $\frac{1}{2}$ " x 1 $\frac{1}{2}$ ", as illustrated, other models up to $\frac{3}{4}$ " x 4".

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KALAMAZOO, MICH.

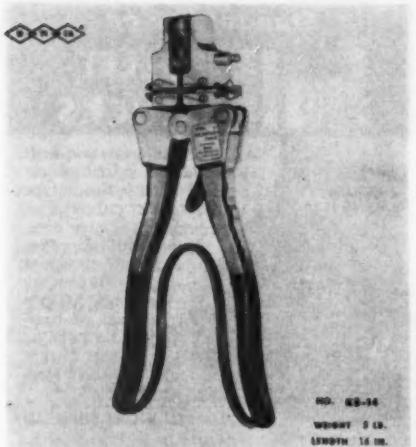
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1297 WEST 78th STREET
CLEVELAND 2, OHIO



weld aluminum and copper, and aluminum to copper wire in a range from .039" (No. 18 gauge) up to but not including .063" (No. 14 gauge, .064" nominal).

The KB-14 tool will handle copper wire from No. 14 gauge up to .089" (No. 11 gauge, .091" nominal). The KB-14 will handle aluminum and aluminum to copper wire in a range No. 14 gauge up to .127" (No. 8 gauge, 128" nominal).

Use ACTION Card, opposite page 64. Encircle No. 32

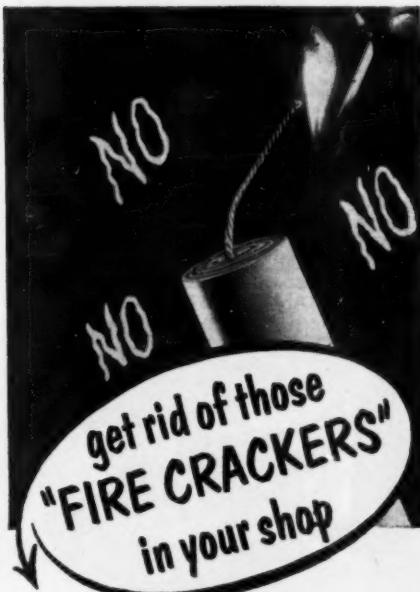
Armstrong ground tool bits

Armstrong Bros. Tool Co., Dept. R-50, 5200 W. Armstrong Ave., Chicago 30, Ill., announces the introduction of two lines of twelve sizes from 3/16" to 1 1/4" square ground tool bits, accurately ground on all four sides with ends bevelled 10°. Both types are available in a full range of twelve sizes from 3/16" to 1 1/4" square.

A new line of Armstrong high speed

ground cut-off blades is announced by the company. These blades are ground on all four sides, having top and bottom edges ground and sides bevel ground for use in cutting-off tools. They are available in a full range of eight sizes from 3/32 x 1/2 x 4 1/2" to 1/4 x 1 1/8 x 7" in two series; one for use in straight and right hand off-set tools, the other for use in left hand off-set tools. All Armstrong ground cut-off blades are packaged for convenient handling.

Use ACTION Card, opposite page 64. Encircle No. 33



What fire crackers? We mean those welding and cutting torches that keep popping—back-firing—burning out valve seats. Did you know that the ingenious new Smith "FLO-TROL" prevents reverse flow of acetylene—protects torch against backfire and burned out seats?

Write us a card . . . NOW!

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KIDDE PRECISION TOOL CORP.

37 FARRAND ST. BLOOMFIELD, N. J.

TOOL ENGINEERS and TOOL MAKERS—

HERE IS
A NEW TOOL TO STUDY
HIGHEST STANDARD OF EFFICIENCY
AND ACCURACY UNRIVALLED
IN PRICE AND
VALUE

It's the NEW

MICRO-LOCK

QUICK FINELOCK +
MICRO FINE ADJUSTMENT COMBINED

made by the
FAIRBANKS

SPECIFICATIONS
Total Length, 9". Measuring Capacity: 6" - Graduations: 1/1600" & 1/128". Code Word: GHBD

Without detachable Base and Scriber — \$25.00
Same as above but with
detachable Base and Scriber — \$33.00
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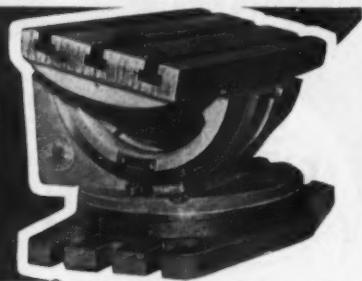
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MONEY BACK
GUARANTEE

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5-3/16" x 10-1/2" table, Type A1, price ... \$166.50
7" x 14" table, Type A2, price \$199.50

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Standardize on

hall COLLET CHUCKS

for
SPEED,
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Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over.

Tremendous grip over or under stock size to .007—without adjustments. All grip...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

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Made in Two Sizes to Fit Your Requirements:

Model A...1" (max. capacity 1-1/16")

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Round, square or hexagon collets, plain or serrated

No. 3 Collet Pads Now Available

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Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height from 31" to 46 1/2", leaving operator's hands free. Table swivels and locks in any position.

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CATALOG NO. 2

**THE MIDWEST TOOL & ENG. CO.
112 WEBSTER ST., DAYTON, OHIO**

Adjustable groove gage measures inside diameters of ring grooves

The diameters of internal grooves such as those for "O" rings, snap rings, "Truarc," etc., are measured swiftly and accurately with a new gage being manufactured by Federal Products Corp., Dept. B, 1144 Eddy St., Providence, Rhode Island.

Called the Model 99P (i.d. groove gage) it is said to have an exceptionally wide capacity and is adjustable to measure groove diameters between .725" and 2.625". The contacts are located at the extreme ends of the gage arms, making it possible to check grooves that are located at the bottom of blind holes.

An important feature of the gage is that the reference or fixed contact is on the lower arm, which means that neither the weight of the gage nor any pressure from the operator's hand will affect the



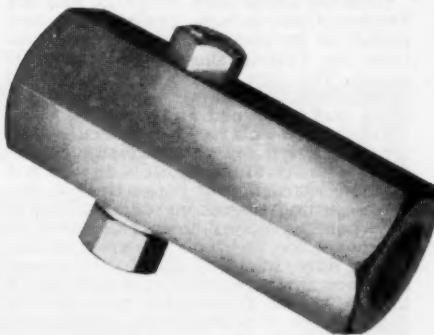
reading. A one-to-one lever pivots in ball bearings, giving dependable repeat readings and accuracy.

Use ACTION Card, opposite page 84. Encircle No. 34

3/8" flow control air valve

Rivett Lathe & Grinder, Inc., Dept. BB, Boston, Mass., announces a new valve to meter flow in one direction and allow free flow in the opposite direction.

Model 3620 Rivett valve features an anodized aluminum body and a nylon poppet. The corrosion-resistant adjusting



Engineered Live Centers

A properly designed Live Center is one of the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job is set up with the right Live Center. Standard shanks with Morse taper carried in stock.

STURDIMATIC
TOOL COMPANY
13902 F STREET • DETROIT 16, MICH

screw has a slotted hex head which may be turned with a wrench or screw driver. Tightening the hex nut on the opposite end of the adjustment screw locks the setting.

Recommended for 150 psi air or 300 psi oil or water, the new $\frac{3}{8}$ " size valve has a 3" length x $1\frac{1}{8}$ " hex, and weighs 6 oz. Use ACTION Card, opposite page 64. Encircle No. 35

Portable air-powered nibblers

Buckeye Tools Corp., Dept. B, Box 966, Dayton, Ohio, is now producing a new model of its portable, air-powered nibblers for cutting sheet metal up to 18 gauge. The new tool has an extended head which permits its use in confined areas and in formed metal panels.

These new tools are being used extensively in the automotive industry for installing air conditioning units on cars and in the construction of house trailers. Because cutting operations can be started anywhere an access hole is provided in the panel for the tool, trailer manufacturers have found it faster, easier and more accurate to assemble the solid panels to the trailer framework then cutting openings for windows, doors, ventilators, etc., after assembly is completed.

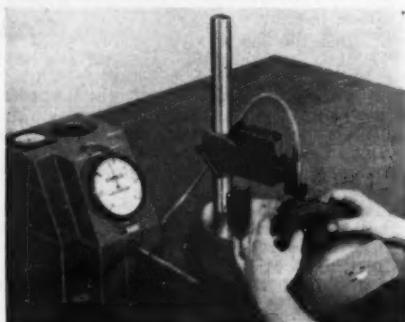
The nibblers are said to make a sharp,

clean cut without distorting the exposed edges of the metal. Capable of cutting a radius as small as one inch, the tool can be used to follow any contour.

Use ACTION Card, opposite page 64. Encircle No. 35

Airprobe gage-head for air gaging

A universal gage-head, called the Air-Probe, for use with the Dimensionair air gage, has been introduced by Federal Products Corp., Dept. B, 1144 Eddy St., Providence, R.I. It can be mounted on a variety of fixtures, making it possible to



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- ✓ GROUND ACME THREADED BODY
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check dimensions of almost any type, either single or multiple. It can also be applied to the regular Federal catalog gages.

A spindle-like device, no larger than a cigarette, the AirProbe is an accurately calibrated instrument that requires no tolerance setting masters. It is set to zero on the accurately graduated scale of the Dimensionair and then adjusted in the gage, just as a dial indicator. All readings are actual calibrated readings, not arbitrary values between minimum and maximum limits. There is long range per

magnification—the available ranges are .003", .006", .015" and .030". Plenty of surplus for easy setting and measuring can be found in the approach travel of .031", spindle travel of .140" and overtravel of from .070" to .100".

Use ACTION Card, opposite page 64. Encircle No. 37

7½ ton power press

The Kenco Mfg. Co., Dept. B, 5211 Telegraph Rd., Los Angeles 22, Calif., announces a 7½ ton OBI power press.

The crankshaft is a solid, one-piece tool of steel, heat-treated and precision-

Swanson

TURRET INDEXING UNITS

Provide a basic chassis to save time and cost in designing and building special automatic machines for a wide variety of manufacturing operations.

These complete* ready-made units are available on short delivery to help solve your automation problems NOW.

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STANDARD UNITS:

20" — 30" — 40" Turret dia.
8—16—24—32 work stations.
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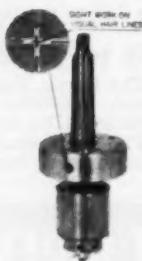
ENGINEERS and BUILDERS of SPECIAL AUTOMATIC MACHINES

SWANSON
TOOL & MACHINE PRODUCTS INC., ERIE, PA.



TOOLMAKER'S DRILL CHUCK

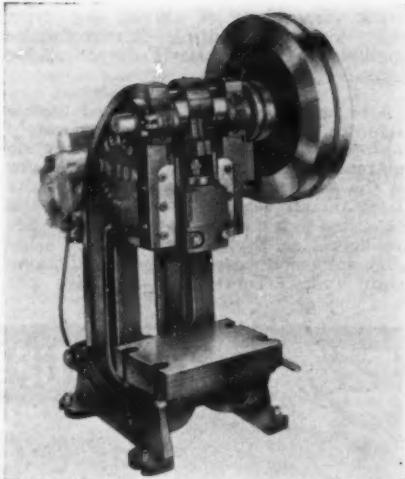
Will locate your layout to .0001"—200% saving in time. For vert. mills, radial drills and lathes. Combination of high precision chuck and totally enclosed optical unit. Adjustment for spindle run-out. Priced considerably less than you might expect to pay for this unique tool. No. 2 or No. 3 Morse taper 0" to $\frac{1}{2}$ " or $\frac{1}{8}$ " - $\frac{5}{8}$ " capacity.



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Several territories open for distribution.

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221 N. CICERO AVE. CHICAGO 44, ILL.



ground. It has a 100 lb. flywheel mounted on two roller bearings. Special alloyed bronze, oversized bearings contain the crankshaft and the connecting rod. The ram and ram guide are 90° , V-type, Sobrocast, oversized in length.

The frame has a safety factor of five. The single trip is standard equipment and can be converted to continuous instantly by moving one lever. It is rated at $7\frac{1}{2}$ tons, with a $1\frac{1}{2}$ " standard stroke; shut-height is $7\frac{3}{4}$ " to the bolster bed, adjustment up, ram down. The bolster plate is $7\frac{1}{2}'' \times 11'' \times 1"$ thick. Any stroke up to 3" is optional at extra charge.

The standard press is a bench model; floor legs are furnished at additional cost.

Use ACTION Card, opposite page 64. Encircle No. 38

Air-O-Chek

THE VALVE WITH THE INTERNAL FULCRUM LEVER

Model FA

Model F

For blowing chips from work — For cleaning out hollow sets, machine recesses and tee slots — For drying parts before inspection and for many similar uses, Air-O-Chek is the Air-gun.

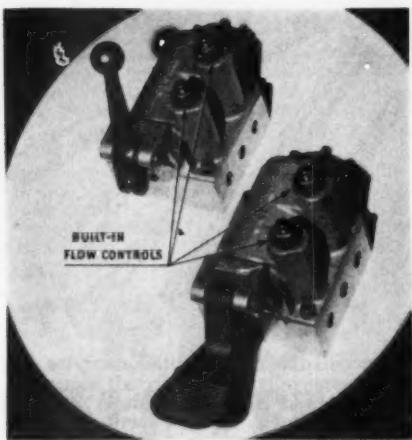
Write for details.

AIR-WAY PUMP & EQUIPMENT CO.
1054 N. Kilbourn Ave. Chicago 51, Ill.

Airmatic announces new 4-way valve

Airmatic Valve, Inc., Dept. B, 7317 Associate Ave., Cleveland 9, Ohio, announces a new hand-and-foot operated four-way valve with patented built-in, full-capacity, flow-control meters of the Venturi type. An air and low-pressure hydraulic valve, specifically designed for the control of double acting air or hydraulic cylinders.

Valves are said to be ruggedly built for heavy duty service and long operating life, featuring one balanced spool using renewable "O" ring type of pack-



ing. The flow control meters permit full-line volume without loss of pressure. Line-pressure variation will not affect valve function.

This basic valve is also available for remote pilot operation, cam, single or double solenoid together with time-delay features. Non-corrosive throughout; available in four standard pipe sizes— $\frac{1}{4}$ "— $\frac{3}{8}$ "— $\frac{1}{2}$ " and $\frac{3}{4}$ "—for air, oil or water, in pressure range 0-150 lbs.

Use ACTION Card, opposite page 64. Encircle No. 39

Fast threading lathe

The Thread-O-Matic, a new high production single-point automatic cycle threading lathe, cuts threads 20 times faster than thread cutting on standard lathes, it is claimed. A 3" 12 pitch thread on 1" stock can be completed in 36 seconds on this newly conceived machine which is designed for capacities of up to 18" in length and 6" in diameter. It is capable of cutting internal and external threads, both left and right handed, taper and multi-start.

The cycle is fully automatic with the cutting tool completing a number of pre-set passes at a pre-set speed and stopping automatically at the end of each cycle. Setup time is minimal with no special tooling required. High working speeds (up to 2000 rpm) and the fast rate of cutting, which can be more than 100 cuts per minute, permit the utilization of carbide cutters to the fullest. S & S Ma-

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Butt Welds
all blades
from 1/16"
to 3/4"

BREN Weld

PORTABLE
BAND SAW BLADE
WELDER



- Permits wide range of work from intricate tool and die to power cut-off saws.
- New large, heavy-duty transformer and simplified controls assure uniform welding results.
- Powerful built-in grinder removes flash from weld.
- Double gauge for checking thickness of weld on flat saws.
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Prompt deliveries.

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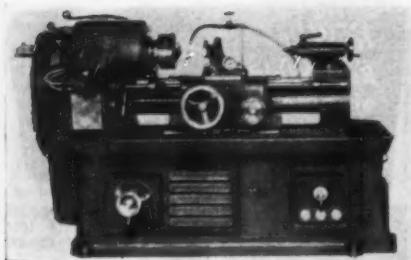
Representatives in Principal Cities



CLIPPER DIAMOND TOOL CO., INC.

210 W. 46 ST. N.Y. 36





chinery Co., 133 53rd Street, Brooklyn 32, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 40

Counterbores and spot facers added to Union line

High speed steel counterbores and spot facers with interchangeable pilots have recently been added to the regular line of metal cutting tools manufactured by the Union Twist Drill Co., Dept. MB, Athol, Mass.

Four styles of standard counterbores and spot facers are being manufactured—long and short set in both straight and

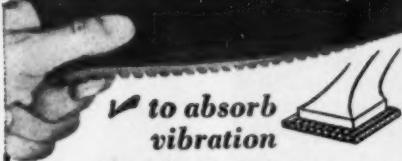


taper shank. Two additional styles are made especially for the aircraft industry—long set and short set with $\frac{1}{4}$ " shanks, these designed for use with portable equipment such as hand drills.

To insure rigidity and permanent alignment, all styles are made with the cutter and shank integral and with the cutting edges well backed; pilots ground from high grade alloy steel, and manufactured in two styles, one style for the standard line, another for aircraft work.

Use ACTION Card, opposite page 64. Encircle No. 41

Put machines on ISOMODE® PADS



- ✓ to absorb vibration
- ✓ reduce noise
- ✓ cut maintenance

Economical, effective mounting — 1 sq. ft. enough for 4 tons of machine weight. Neoprene — lasts for years, $5/16$ " thick, 18" square, tan to the standard package. Easily cut to shape and installed under most machines — big punch presses included. No cementing necessary. Write for Bulletin No. 415.

The MB Manufacturing Company, Inc.
1067 State Street, New Haven 11, Conn.

New! "OLIVER" Heavy Duty Oscillating and Tilting SPINDLE GRINDER

Cuts costs
of airplane
plants and
other metal
workers



Grinds difficult work accurately. Its 1-inch spindle rotates at 1800 rpm. and oscillates $1\frac{1}{8}$ " with 56 strokes a minute. Spindle tilts up to 45° toward operator, 5° away. Takes drums up to 6" diameter, 9" long. Spindle has 3" vertical adjustment to provide full use of grinding area. Write for Bulletin 381-DM.

OLIVER MACHINERY COMPANY
Established 1890 Grand Rapids 2, Mich.

Microfinish comparator

The S-22 microfinish comparator permits roughness to be specified in accordance with adopted standards on the same basis as linear measurements.

Machined finishes were formerly designated by the lower case letters *f*, *ff*, *rf*, etc. This was not based on any fundamental standard of measurement. One man's opinion of what surface finish was intended could be as good as another's. Recently, however, instruments have

been developed for the measurement of surface roughness. This ability to accurately measure surface roughness made possible the adoption of standard surface finish designation. Under the sponsorship of the Society of Automotive Engineers and the American Society of Mechanical Engineers a committee was formed to develop these surface finish standards.

The Baptist comparator is a surface roughness scale illustrating 22 typical machined flat surfaces capable of being

"RFC" **ROLL-FEEDS**

FITS ANY PRESS

For side or rear feeding. All attachments for installing furnished, including disc and connecting linkage.

CAN'T SLIP

Each wedge has four points of contact to safeguard accuracy.

REVERSES INSTANTLY

Merely shift feed finger spring from one lug to the other.

FEEDS IN THOUSANDTHS

Amazingly accurate stock movement assured.

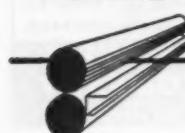
MAINTAINS ORIGINAL SETTING

Regardless of use or wear. No ratchets or pawls to wear down and "Throw off" feed spacing.

Ready for mounting! Furnished complete.

Write today for
latest Bulletin.

EARLY DELIVERY ON STANDARD MODELS



Tel. Pawtucket 2-2200

PAWTUCKET, RHODE ISLAND



NIELSEN

Heavy Duty Live Centers

Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

NIELSEN, INC. LAWTON, MICH.

MICRO-HEIGHT GAUGE

BY FAIRFIELD GAUGE CO.



NO OTHER GAUGE COMPARES FOR FAST, ACCURATE LAYOUT AND MEASURING

Capacities to 6" when used with this
Fairfield Gauge
3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths. Use as a scribe for fast layout, or insert dial indicator for quick, accurate inspection.

Exclusive distributor for U.S. and Canada:

CLEVELAND INSTRUMENT CO.
735 Carnegie Ave., Cleveland, O.

HOW TO SAVE CUTTER COSTS!



Case History . . .

An automotive parts supplier reduced his cutter costs by over 25% with our woodruff keyseat cutters. These tests were conducted under actual production conditions. Get the details of this cost reducing story.

We are woodruff keyseat cutter specialists and have been for over 30 years.

Fast service on special cutters.

Jobbers, Mill Supply and Mfg. agents inquiries are welcome.

QUALITY TOOL WORKS
790 S. MARKET STREET
WAUKEGAN, ILLINOIS

Micro
Supreme

LAY-OUT AND IDENTIFICATION DYE

7 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY

8615 Grinnell Ave. • Detroit 13, Mich.

produced by six different methods of machining, and having nine roughness height values from 2 to 500 microinches (millionth of an inch). These surfaces are in accordance with Part 2 of American Standard Physical Specimens of Surface Roughness and Lay—ASA B46.2.1952, which describes surface roughness specimens for visual and tactful comparison. The roughness height values are the arithmetical average deviation

from the mean surface expressed in microinches.

The comparator is composed of individual specimen blocks which are accurately machined from stainless steel to the specified standard finishes. These blocks are mounted in the master pattern against which electroforms are made. The result is the negative surface of the master. Baptist Machine Co., Inc., Dept. B, 703 Pacific St., Stamford, Conn. Use ACTION Card, opposite page 64. Envelope No. 77



What FEATURES do

YOU WANT in a

UNIVERSAL JOINT?

- Maximum strength and bearing surface
- Quick-acting, dependable response
- Long service-life
- Optimum operating angle
- Close quarter operation
- Accurate surface grinding
- High concentricity
- Minimum weight

LOVEJOY

HAS THEM ALL!

Available in 13 standard sizes—diameters
1/2" to 4"—bore 1/4" to 2"—lengths 2"
to 10 5/8"

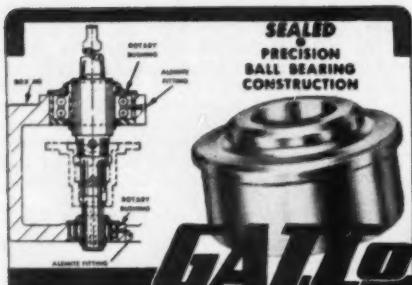
WRITE NOW FOR CATALOG AND PRICES



LOVEJOY FLEXIBLE COUPLING CO.

4829 W. LAKE STREET CHICAGO 44, ILLINOIS

Manufacturers of flexible couplings, variable speed pulleys
and transmissions.



**SEALED
PRECISION
BALL BEARING
CONSTRUCTION**

GATCO

ROTARY BUSHINGS FOR DRILLING, CORE DRILLING ROUGH AND FINISHED BORING

The inner race of the GATCO bushing rotates with the tool, piloting and tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

ROTARY BUSHINGS

42326 ANN ARBOR ROAD, U.S. 12, PLYMOUTH, MICH.
Telephone PLYMOUTH 1472

**TAP
MAGIC**



Cuts clean threads — acts instantaneously
Frees stuck taps and reamers right now!
Speeds tapping — not a cutting oil

Dealers and jobbers: Some territories still available.

Write:

SMITH TOOL & ENGINEERING CO.
A division of Smith-Cage — Yucaipa, California

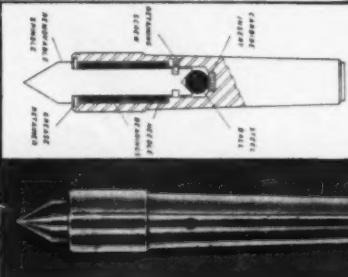


HEAVY LOADS—HIGHER ACCURACY WEE LIVE CENTERS

The Wee exclusive SMALL HEAD design eliminates tool obstructing bulk, increases machine capacity. Offers faster, chatter-free, accurate performance in lathes, grinders, hobs. Outlast larger centers. Test one, learn why leading plants order and reorder. No. 2, M. T., \$21.00. Request complete price list. Prompt delivery.

Write direct, if distributor cannot supply you.

HERBERT CROSS & SON, Bala-Cynwyd 2, Pa.



Plain Type

**CLOSED
TRADE AUTOM MARK**



**CLOSED
MARK**

Offset Type



CONTINUOUS HINGES
AUTO MOULDING & MFG. CO.
1110 E. 87TH ST.
CHICAGO 19, ILL.

Improve electro-chemical marking

An improved simplified approach to electro-chemical marking is claimed in the new Crown E-Z mark etcher by Crown Industrial Products Co., Dept. B, 907 Amsterdam St., Woodstock, Ill.

Designed for production marking or individual identification, setup time is short. Particularly well suited for marking hardened and ground surfaces, aluminum, and stainless steel—it easily handles less



difficult metals such as zinc, copper, steel, and their alloys as well as most platings.

The etcher consists of a power unit and a separate tray attachment. Separation of the units allows for more flexibility of application, simplified cleaning, and fewer maintenance problems.

Use ACTION Card, opposite page 64. Encircle No. 85

Improved Di-Profiler rocks as it hones or files

A clamp, that is positioned and tightened by means of a thumb-screw, permits the hone or file of the improved Di-Profiler to be rocked or rotated to conform with the contour of the die or part being worked. A regulated reciprocating stroke of from 0" to $\frac{1}{4}$ " can be operated at any desired speed from 0 to 15,000 strokes per minute by a handy foot control.

The rocking feature and the stroke



control is said to make this multiple purpose precision machine for tool makers a high production substitute for the old hand way of die filing and finishing. Practically vibrationless, this tool is claimed to speed up die work by as much as 50 times where such work requires an extreme amount of finishing. Nord International Corp., 449-86 Central Ave., Orange, N.J.

Use ACTION Card, opposite page 64. Encircle No. 86

Versatile toolholder

Said to perform work of 10 single purpose toolholders; handles any lathe operation, as well as planer, shaper and special equipment. Suited for use with



carbide tools. Bit and holder always parallel; two openings for the tool bit run parallel to the center line of the holder. Once holder is set up, bit can be removed for regrinding and replaced without resetting the holder. Elk universal

tool holder distributed by Acme Tool Co., 71 W. Broadway, Dept. B, New York 7, N.Y.

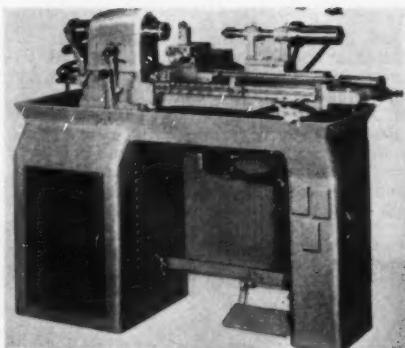
Use ACTION Card, opposite page 64. Encircle No. 87

Position plate developed for use with Multi-Drill

The Fixed Position plate—a new accessory, said to permit quick, easy conversion of the Multi-Drill to a fixed spindle multiple head without eliminating the advantages of the fully adjustable Multi-Drill, has recently been introduced by the Commander Mfg. Co., Dept. B, 4225 W. Kinzie, Chicago 24, Ill. From 2 to 8 spindles may be installed in a Fixed Position plate.

Quickly and easily attached to any Multi-Drill, the plate provides fast, accurate setups of intermittently run repetitive jobs. Initial setup for a specific job requires drilling a hole for each lock-in-position spindle assembly using a layout guide which is provided. Any slight irregularity in drilling the plate is compensated for when the spindles are installed and locked in position.

Once a plate is set up for a job with spindles and drills properly located, it

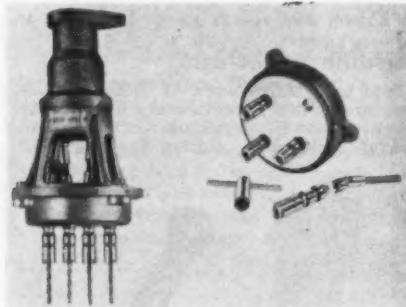


The headstock spindle is the pre-loaded ball bearing type capable of speeds to 4000 rpm.

Either a draw-in collet 1" capacity or a stationary collet 13/16" capacity can be supplied; unit powered by a 3/4-1/2 hp motor through a clutch brake drive, the latter being wired into the carriage cycle to stop and start the spindle for part changes. Swing 11", carriage travel 13", automatic tool relief.

Elgin Tool Works, Inc., Dept. A, 1771 Berteau Ave., Chicago 13, Ill.

Use ACTION Card, opposite page 64. Encircle No. 89



may be stocked in the tool crib for instant attachment whenever it is required. Minimum hole centers of 1/2" to a maximum of 9" are possible.

Use ACTION Card, opposite page 64. Encircle No. 88

Elgin production lathes

The Elgin high production air feed lathe is a new design, with features of high precision, efficiency, simple operation and rigid construction, it is claimed.

The carriage is pneumatically-hydraulically powered in an automatic cycle.

Elgin Abrasives Div. to market rotary tools; supplements diamond line

Elgin National Watch Co., Dept. B, Elgin, Ill., is entering the fast-growing tungsten carbide field with a complete line of high-precision rotary cutting and grinding tools for marketing to the metalworking trades through its abrasives division.

These are a supplement to the present line of diamond abrasives, for finishing close-tolerance tools, dies and other mechanical parts.

To be marketed under the "Golden Circle" trade mark, the tools will include a complete range of shapes, sizes and cutting actions for all types of material, finishes and processing methods.

Burrs and files are available in seven shapes—plain cylindrical, ball nose, ball, egg shape, tree shape with radius end, tree shape with pointed end, and cone. They are available in either tungsten carbide or high-speed steel; hand-ground, machine-ground or file cut, and in center-fluted or segment-fluted design.

Use ACTION Card, opposite page 64. Encircle No. 90

Wilton introduces line of air-hydraulic vises

Wilton Tool Mfg. Co., Dept. B, 925-941 Wrightwood Ave., Chicago 14, Ill., has just announced the development of a complete line of power operated vises under the trade mark "WiltOmatic."

The conventional vise screw and handle pre-sets the jaw opening to the size of the workpiece; the power unit, which is attached to a conventional Wilton vise,



has an adjustable power stroke from zero to $\frac{3}{4}$ ". Maximum jaw opening varies from 3" to 9" depending on size of vise. The power stroke is activated by either a foot or hand control.

Use ACTION Card, opposite page 64. Encircle No. 52

HYPNEUMAT SERIES 500 HEAVY DUTY DRILLING-TAPPING UNITS

For Heavy Duty Drilling-Tapping and Deep Hole Drilling. Capacity to $1\frac{1}{2}$ " in Cast Iron.

HYPNEUMAT INC.
647 W. VIRGINIA ST. • MILWAUKEE, WISC.

August, 1954



LASSY

HAND TAPPERS

set a new standard
for cut thread
accuracy and with
non-skilled help.

Lassy Tool Co.
Plainville, Conn.

SURFACE

PLATES



BLACK GRANITE

Produced from the unexcelled, hard fine grained black granite of California. Fabricated, polished and lapped in one continuous operation. Flatness and accuracy of surface guaranteed. All sizes in stock for immediate delivery. Send for folder and prices. Dealer inquiries invited.

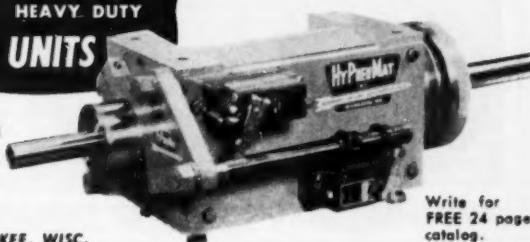
MOJAVE GRANITE CO.
1651 Miller Ave., Los Angeles 63, Calif.
Since 1915



The simplified PYRO Optical is the ideal instrument for direct temperature readings of ANY heated object in your plant. Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT ($3\frac{1}{2}$ lbs.) and FOOLPROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS. Fast MOVING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 80
THE PYROMETER INSTRUMENT CO.
New Plant and Laboratory, Bergenfield 3, N. J.

STROKES TO 25"



Write for
FREE 24 page
catalog.

CARROLL and JAMIESON

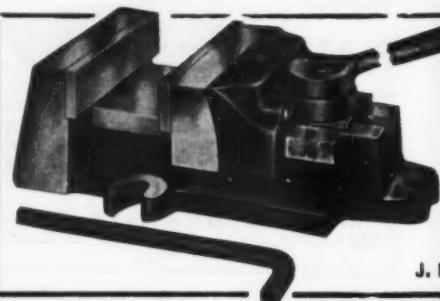
- 16" Lathe
- 12 Speed Geared Head
- Motor Drive Timken Mounted Spindle
- Modern Design
- Liberal Dimensions

Carroll & Jamieson Machine Tool Co.
BATAVIA, OHIO, U.S.A.



Write
for

Bulletin 39-A-10



Plunket Quick Action Vise
for DRILL PRESS or MILLING MACHINE
Designed for production work, using an eccentric motion to apply pressure to jaws. Eccentric motion moves jaws 5/16".
Size No. 7

6" jaws, 1 1/2" deep, opens 4".....\$83.16
Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.
Our complete line includes Vises for Drill Presses, Milling Machines, Shapers, Grinders

WRITE FOR CATALOG

J. E. Plunket Machine Co. 3230-32 Archer Ave.
Chicago 8, Ill.

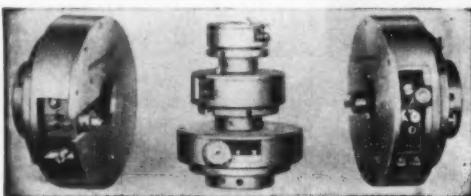
*You Need an Extra Hand Now
to Speed Up Production!*

HEIMANN TRANSFER SCREW SETS

IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.

HEIMANN MFG. CO. • URBANA, OHIO

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per-hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money too!



MUMMERT-DIXON FACING HEADS

with Automatic Feed

One-way Tool Feed—6, 9 and
12" sizes.

Two-way Tool Feed—9, 12, 16,
20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.
Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

Nut, bolt holding tool

Stevens Walden, Inc., Dept. B, Shrewsbury St., Worcester 4, Mass., manufacturer of Spintite wrenches and mechanics' hand tools, has announced a new "Grip-Spintite" which is said to be suitable for assemblers, repair and maintenance men, and mechanics for a nut or bolt holding tool.

The Grip Spintite securely holds either nuts or bolts for use in general repair or assembly and eliminates the possibility

of these pieces dropping into machines, instruments or apparatus.

Utilizing a precision machined and finished taper lock construction, this wrench holds or releases the nut or bolt with a simple push or pull on the locking sleeve.

The manufacturer emphasizes the fact that the wrench is not merely a starter but actually a complete tool that clamps on the nut or bolt while tightening or loosening. There are no springs or magnets, consequently the tool can be used



CAMPBELL Nibbling Machines

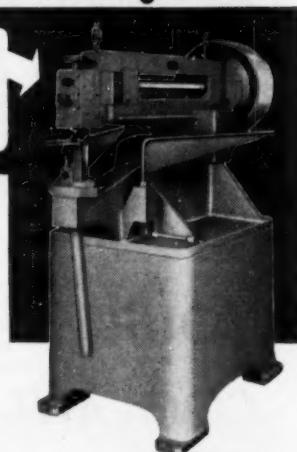
Model 2524
Interchangeable
speeds of
375-650 strokes
per minute

How this CAMPBELL Nibbler steps up production

• Work is fed with both hands into this CAMPBELL Nibbling Machine as the cut can be made in any direction without rotation of head. A template, clamped above the work, guides punch accurately to any shape or design.

MODEL 2524 cuts low carbon steel and other soft materials up to $\frac{1}{4}$ " thickness. The nibbled part is relatively smooth and requires finishing only for an absolutely smooth edge.

This machine has a throat depth of 24" and has an adjustable stroke feature. This permits efficient



cutting of all thicknesses of material up to the maximum capacity of machine. The machine is equipped with V-belt drive completely enclosed.

CAMPBELL makes a complete line of Nibblers and Abrasive Cutters. Let us recommend the nibbler or abrasive cutter best suited to your job. Write for catalog.



**Campbell Machine Division
AMERICAN CHAIN & CABLE**

937 Connecticut Ave., Bridgeport 2, Conn.

Wet and Dry
Cutters and
Nibblers



on all types of materials.

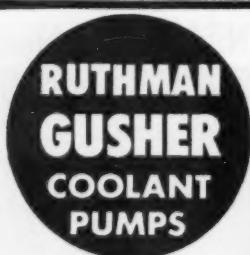
It is manufactured in 12 sizes from 3/16" to 11/16".

Use ACTION Card, opposite page 64. Encircle No. 92

Wittek sprocket-ratio calculator

The Wittek Mfg. Co., Dept. BB, 4305-15

West 24th Place, Chicago 23, Ill., is offering free a slide rule calculator for determining at a glance the correct sprocket ratio to be used on the chain drive for the Wittek automatic roll feed for punch presses. The sprocket ratio determines the rate at which stock is fed to the press for each piece. This rate depends upon the length of feed and the percent of the press stroke available for feeding. The required sprocket ratio can be read directly on the calculator for any combination of feed length and percent of stroke



SOLVE YOUR COOLANT PROBLEMS

This Hardinge Model HCT Chucking Machine with Production Threading Head is equipped with a Gusher Coolant Pump.



For all your coolant pump requirements, there's a type and capacity Gusher Coolant Pump to meet your every need.

You can choose between immersed type, outside mounted pipe connected, flange mounted with external or internal discharge in capacities up to 200 G.P.M.—1/30 to 2 H.P. Shaft and belt driven models also available. Write for our complete catalog.

THE RUTHMAN MACHINERY CO.
1816 READING ROAD

CINCINNATI, OHIO

between 1" and 18" for length of feed and from 25 to 80% of stroke.

Use ACTION Card, opposite page 64. Encircle No. 93

New machine drills and reams opposed holes in line

A new machine claimed to drill and ream opposed holes in line, at a much higher production rate than has heretofore been possible, has recently been

announced by the Govro-Nelson Co., Dept. MB 1933 Antoinette, Detroit 8, Mich.

The machine incorporates a 6-station, Geneva-type indexing dial, electrically interlocked with 4 Govro-Nelson K H automatic drilling units. The part that is being drilled and reamed, upon being manually loaded and clamped, is automatically drilled, reamed, unclamped and ejected.

Use ACTION Card, opposite page 64. Encircle No. 94

Announcing... 2 BANDSAWS in 1

The Versatile NEW WELLS 49-A

USE IT AS A VERTICAL BANDSAW

In this position the New Wells 49-A is a Utility Upright Bandsaw for vertical cutting of angles, slots, notches, bevels and contour work. Ample power, efficient (3 speed) V-Belt Drive and sturdy construction assure smooth, even cutting.



USE IT FOR HORIZONTAL CUT-OFF

In this position your dual purpose New Wells 49-A becomes an Efficient, Economical Horizontal Cut-Off Saw that will handle "man sized" cut-off jobs in large or small shops. It's an ideal tool for "job-site" work and handy for maintenance or utility work.

Write today for complete information.



Products by Wells are Practical
**METAL CUTTING
BAND SAWS**

WELLS MANUFACTURING CORPORATION
707 COOLIDGE AVE. THREE RIVERS, MICH.

LINLEY noiseless RIVETING MACHINES



Cut time and cost in rivet spinning

These fast, sturdy, easily operated machines put your riveting on a production basis in terms of speed and low cost. We'll gladly demonstrate what they can do and the high quality of work they turn out. Send samples of your parts to be riveted and we'll give you time and cost estimates on handling your rivet spinning on a LINLEY.

Sizes and types for iron and cold rolled steel rivets up to $\frac{3}{8}$ "; larger capacity for rivets of softer materials.

Send TODAY for bulletin R

LINLEY BROS. CO.

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HYDRAULIC PRESSES



1½ to 75 ton

Capacity

Send for
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Showing
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GREENERD ARBOR PRESS CO.

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NASHUA, N.H.



Multiple Spindle Magazine Feed Power Screw Driving Machines

Latest type equipment for driving screws faster in products requiring two or more screws. These machines operate easily and require very little attention or adjustment once they are put in production.

Part Feeder

Automatic Part Feeders are adaptable to production jobs requiring the handling of small parts. Parts poured into hopper are arranged and fed down track in proper order. Send sample parts when writing for quotation.



COOK & CHICK CO.
640 SOUTH MILLER ST.
CHICAGO 7, ILLINOIS

"DAVIS" KEYSEATERS



are
moderately
priced
Efficient
Economical
Durable

Built in 3 sizes for cutting keyways $1/16$ " to 1" width. Circular upon request.

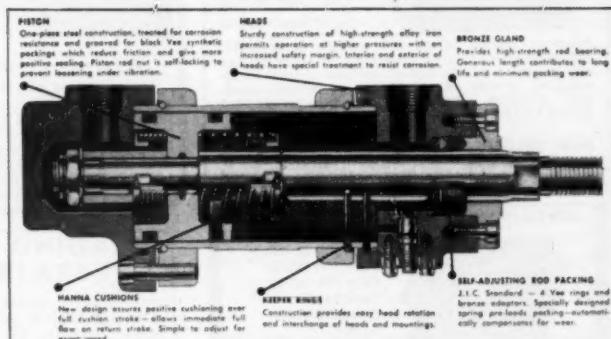
DAVIS KEYSEATER CO.
407½ Exchange St. Rochester 8, N.Y.

Fluid power cylinders feature improved design, performance

New fluid power cylinders claimed to feature unusually large capacity to size ratio and to deliver radically improved performance have been introduced by Hanna Engineering Works, Dept. B, 1751 Elston Ave., Chicago 22, Ill.

In engineering these new cylinders, identified as the 750 series, Hanna stressed the need for a cylinder line incorporating new features desired by industry in its ever-broadening use of cylinder power.

The new 750 re-design is also said to produce a more compact cylinder of large



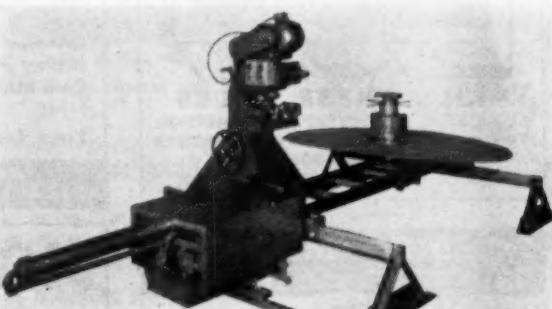
capacity with virtually unlimited application; have a new cushion design with positive, easy adjustment; reduce friction to a minimum consistent with positive sealing. It conforms to J.I.C. standards. Use ACTION Card, opposite page 64. Encircle No. 96

Elliptical head shear and flanging machine

The elliptical head shear and flanging machine, Model 49, for truck and trailer tank heads, manufactured by Blue Valley Machine & Mfg. Co., Dept. B, 6832 Truman Rd., Kansas City 3, Mo., is said to flange all thicknesses of flanging material up to $3/16"$, or high tensile material up to 10 ga. in all type and shaped heads—round, flat, standard dish or reversed dish. Head circumference is held to a variation of $3/16"$, it is claimed.

Both shear and flanger are operated from the same controls. Before flanging, the head is sheared to size and shape from the same template, without removing it from the machine. Heads are finished, ready for the tank, when they come off the machine.

Use ACTION Card, opposite page 64. Encircle No. 97



Self-contained hydraulic feed unit

These new Hoefer hydraulic units are said to be the answer to fast, low cost production on a variety of work pieces or operations, requiring drilling, reaming, boring, facing or milling.

Completely self-contained, these units provide single purpose machining effi-

PRECISION TOOLMAKERS VISE



1/4" Jaw \$18.40
1/2" Jaw \$32.95

Precision ground square and parallel to .0004/in. non-cumulative. Ground dovetailed slides. Hardened and ground jaws. Dustproof enclosed screw. Ample stamping grooves. Excellent for jig-boring, precision grinding, inspection. 10 day money-back GUARANTEE.

Dealer inquiries invited.
AIR TRANSPORT EQUIPMENT, INC.
Old Country Road Minneapolis, N. Y.

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T-NUT & STUD SETS
STEP BLOCK SETS
PUNCH PRESS SETS

QUARTER TURN SCREWS
SHOULDER SCREWS
DOUBLE END AG FEET
SCREW TYPE JIG FEET
PRESS TYPE JIG FEET
FLANGED NUTS
CUT THREAD STUBS
TEE-NUTS
COUPLING NUTS
ADJUSTABLE STEP BLOCKS
STAR TYPE HAND KNOBS
HEXAGON TYPE HAND KNOBS
HORNSHEAD HEAD SCREWS

Northwestern
118 HOLLIER AVE., DAYTON 3, OHIO



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature
WATTS BROS. TOOL WORKS
Wilmerding, Pa.

BREMIL

The IMPROVED Compound Lever Shears

ALL ALLOY
FULLY
GUARANTEED



Two Sizes

PORTRABLE

No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to 1/4" steel plate.

BREMIL MFG. CO.
1020 Holland Street, Erie, Penna.

DANNEMAN Precision DIE-SETS

Precision-Bored
on Master Plates



DANNEMAN DIE-SET DIVISION
ACME-DANNEMAN COMPANY, Inc.
201 Lafayette St., New York 12, N. Y.

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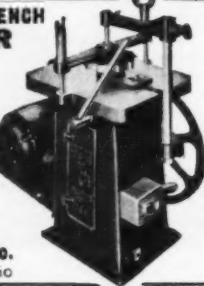
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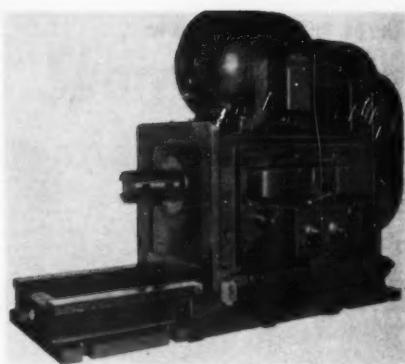
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Use ACTION Card, opposite page 64. Encircle No. 98

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The American Cam Co., Dept. BB, Hartford 1, Conn., has now added to its line of screw machine tools Amcam-X cut-off blades.

Fabricated from a special cast steel alloy for maximum hardness, Amcam-X blades are available to fit standard holders.

Use ACTION Card, opposite page 64. Encircle No. 99

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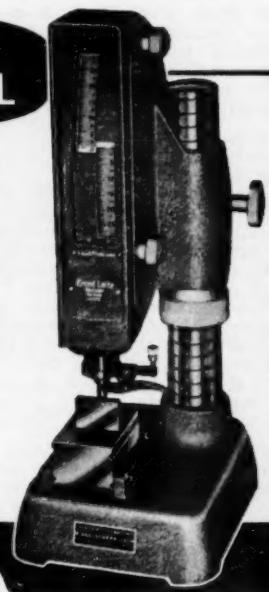
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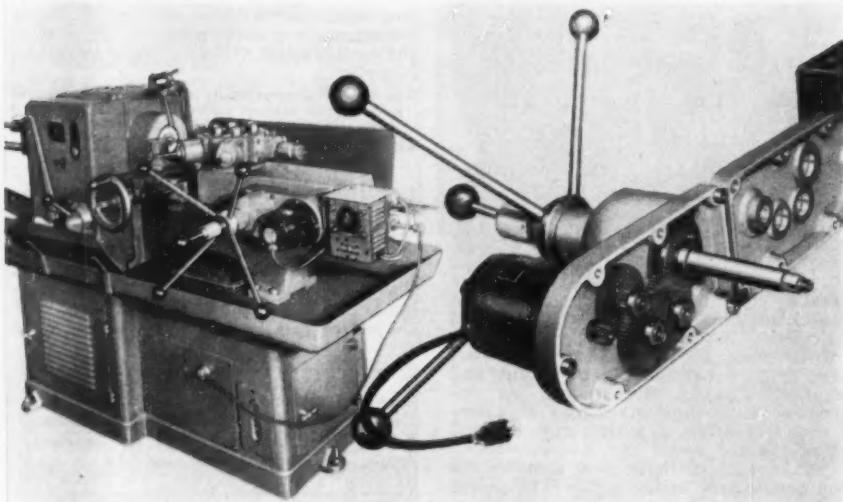
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Oster equips No. 601 "Rapiduction" turret lathe with new electric powered carriage feed



The Oster Mfg. Co., Dept. BB, 2057 E. 61st Place, Cleveland, Ohio, announces a new electric power feed for their "Rapiduction" turret lathe. Since it is a complete unit, it is available for easy installation on machines already in use as well as on new equipment.

This feed unit for the turret carriage consists of a 1/15 h.p., 1750 rpm motor which drives the carriage rack pinion through a spur gear reduction, consisting of alloy steel gears, flame hardened. A small transformer mounted in the control compartment of the machine provides 110 volt A.C. current to a rectifier and control unit which comprises a small selenium rectifier and variac. The rectifier converts the A.C. current to D.C. and the variac varies the armature voltage to the motor. The varying of the armature voltage changes the speed of rotation of the motor and this in turn governs the rate of travel of the turret carriage.

A limit switch is provided which automatically cuts out the carriage feed when the carriage is 1/16" away from a positive stop. The six turret carriage stops are set in conventional manner and no adjustment is necessary to the limit switch which is common to all six stop screws.

A cone clutch, operated by a cam and

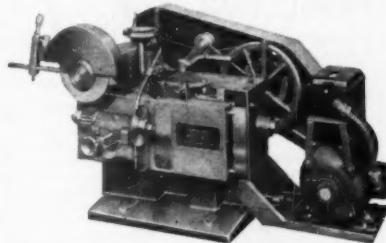
mounted on the end of the carriage rack pinion shaft, engages or disengages the electric power feed. When disengaged by the control handle the turret carriage can be manually operated by the capstan type turnstile. The No. 601 turret lathe, therefore, does not become semi-automatic and the operator has complete control of the turret feed at all times. He can throw out the power feed at any time and retract the carriage or choose whether to use power or hand feed, depending on the operation.

Also, it is possible to change the rate of feed from one operation to another independently of the spindle speed. The turret carriage feed is in no way connected to or driven from the headstock and therefore the rate of feed to the carriage in inches per minute remains constant, for a given load, for any one setting of the feed control knob. The feed in inches per revolution thereby depends on the spindle speed.

Rates of feed to the turret carriage from 1.40 to 20.00 inches per minute are obtainable through the various settings of the feed control knob. Feeds in inches per revolution for the control knob settings and spindle speeds are shown on a speed and feed plate mounted on the machine.

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Three new cobalt-chromium-tungsten hard-facing alloys in welding rod form are announced by Crobalt, Inc. Known as Crobalite alloys, these materials are applied to steel and cast iron parts to provide high hardness and high resistance to abrasion, corrosion, oxidation and impact. They retain these properties at red heat, can be heated to 1600° F. with no permanent loss of hardness, and are not affected by repeated heating and cooling, it is claimed.

These alloys are applied by oxy-acetylene torch or inert arc welding, either manually or by semi-automatic machine, using standard hard-facing procedures. They flow on readily in a uniform, slag-free layer, and bond firmly with minimum inter-alloying. When applied, they consist of a dense, hard layer of complex wear-resistant carbides evenly distributed in a cobalt matrix, essentially identical to Crobalt cast-alloy cutting tools. Crobalt, Inc., 2800 S. State St., Ann Arbor, Mich.

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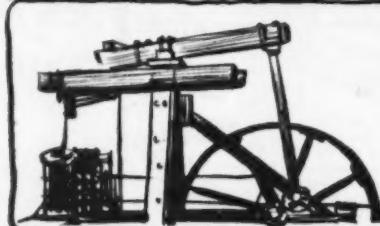
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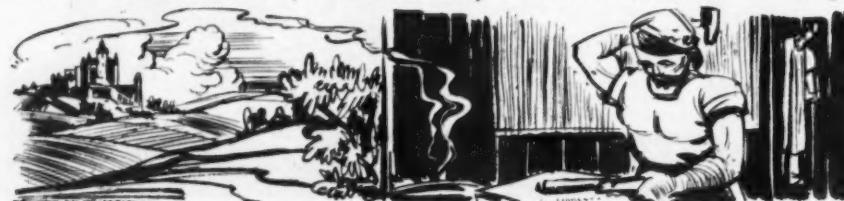
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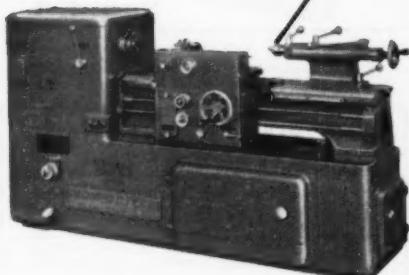
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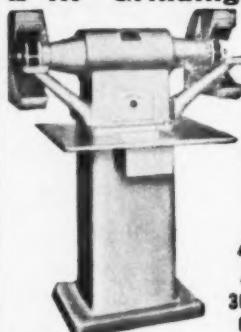
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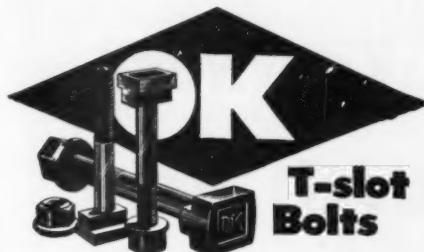
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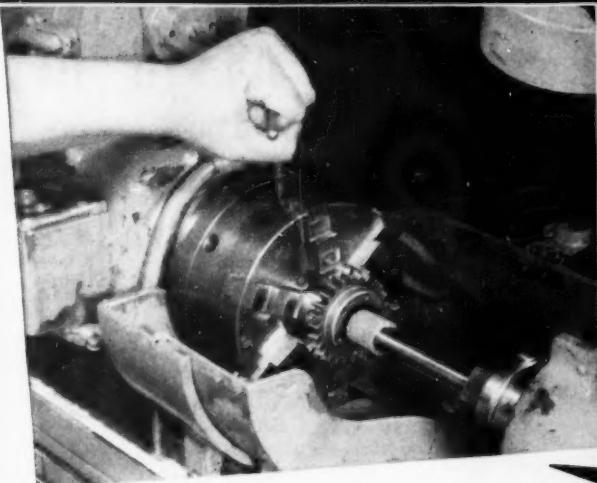
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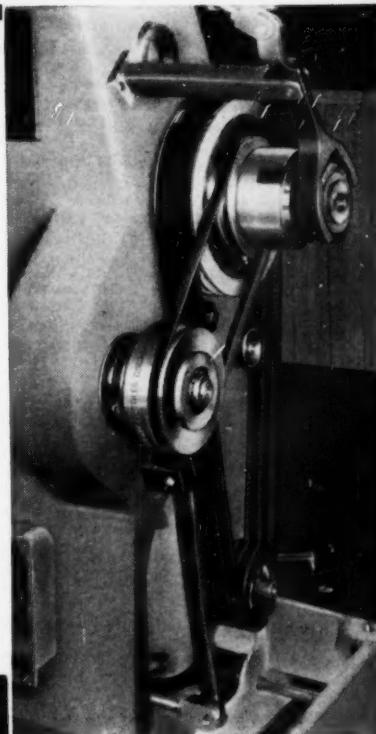
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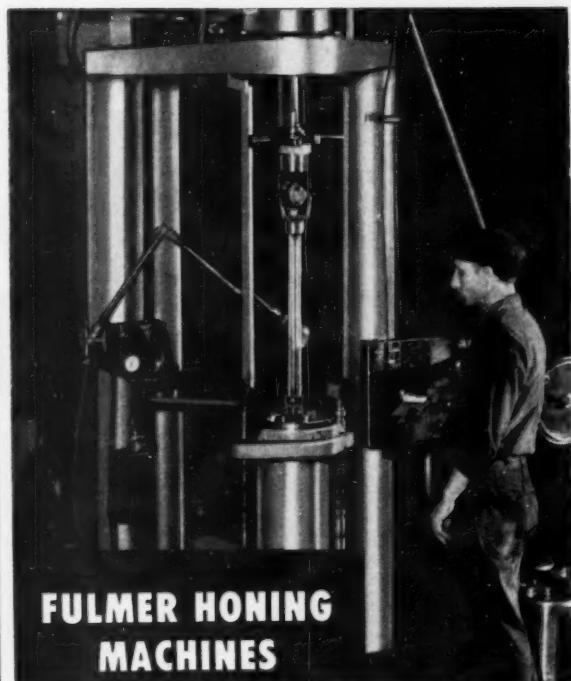
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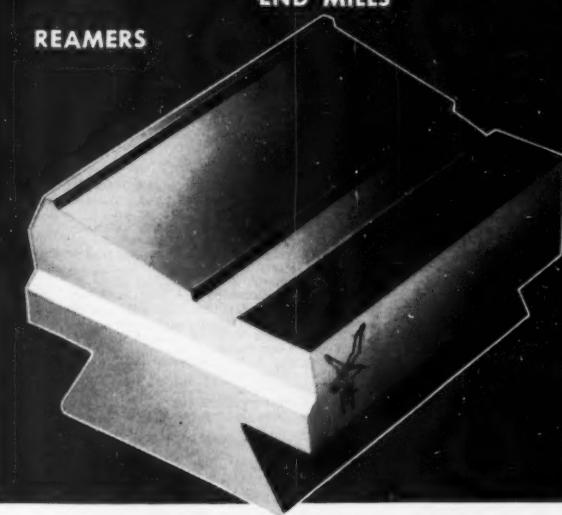
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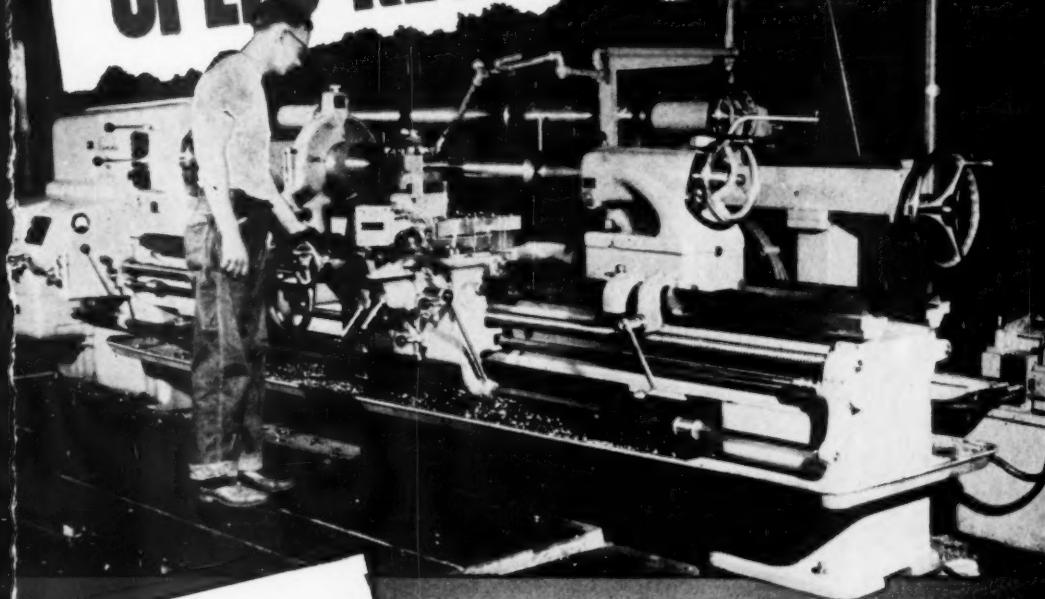
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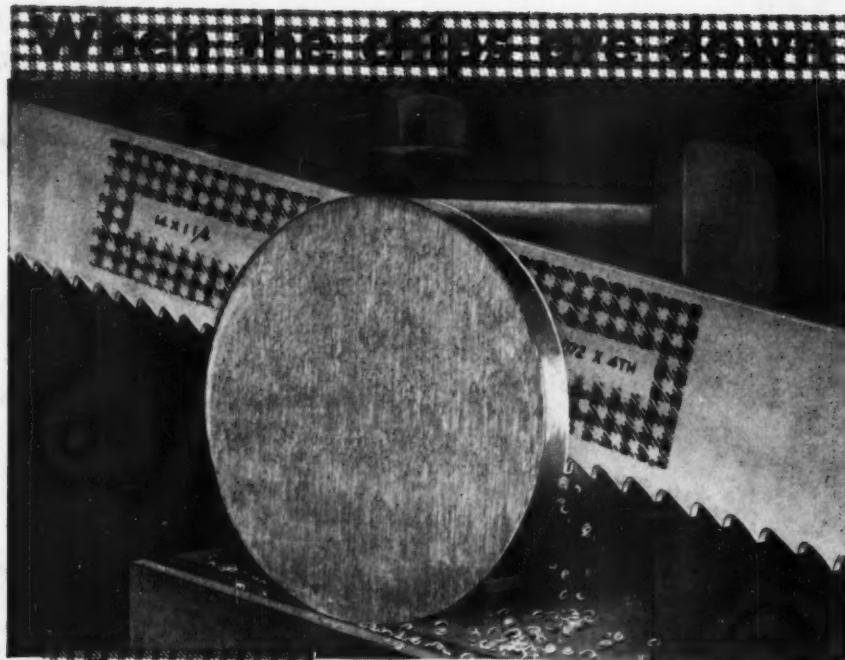
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